Vegetable Gardening Encyclopedia

GROWING · FREEZING · CANNING · DRYING · STORING

SPECIAL SECTION ON HERBS

Planning Your Garden

Any gardener will tell you that gardening is one of the most absorbing and rewarding occupations you can undertake. Any gardener will also tell you — probably loudly and at length — that gardening requires patience, resilience, hard work, and a lot of planning. Paperwork is probably the last thing you have in mind when you think about growing your own vegetables. More likely you see yourself leaning contently on your spade as all sorts of lush, healthy plants shoot up in front of your eyes. The fact of the matter, though, is that gardening begins not with seeds and a spade but with paper and a pencil.

A successful vegetable garden begins with a well-organized plan of your garden space. Drawing a plan may not sound as exciting as getting outdoors and planting things. But if you don't spend the necessary time planning what to grow in your garden and when and where to plant it, you may spend the rest of the growing season correcting the mistakes you made because you didn't have a plan. It's a lot easier to erase a bed when it's a few lines on a piece of paper than when it's an expanse of soil and plants.

Your plan should include not only the types and quantities of vegetables you're going to grow and how they'll be positioned in your garden, but also planting dates and approximate dates of harvest. Making a plan may seem like a lot of work to get done before you even start gardening, but careful planning will help you make the best use of your time and available space and will result in bigger, higher-quality crops.

This chapter discusses all the questions you need to take into account when you're planning your garden — the hows, whats, whys, whens, and wherefores. The specific cultural requirements of each vegetable are given in detail in Part 2.

THE FIRST DECISION: WHAT TO GROW (AND HOW MUCH)

The first step to planning a successful vegetable garden is to decide which vegetables to grow. This may sound fairly straightforward, but there are a lot of factors involved, and you need to answer some basic questions: What vegetables do you and your family like? Do you want to eat all your crop fresh, or store or preserve some of your harvest? Can you grow the vegetables you like successfully in your climate? How much time and energy can you put into your garden? The first factor to consider is personal preference.

What vegetables do you like to eat? The first decision to make in choosing what to grow in your vegetable garden is simple: What vegetables do you and your family like to eat? Perhaps you'd love to grow peas because you remember how wonderful they tasted fresh out of the garden in your childhood. Or maybe your family's crazy about spinach salad or broccoli casserole, or you're just plain tired of frozen vegetables.

What are you going to do with it? How do you plan to use your vegetables, and what are you going to do with the part of your crop that you don't eat as soon as it's harvested? Do you want to freeze, can, dry, store, or make preserves with some of your crop?

How much do you need? How you plan to use your vegetables directly affects how much of each vegetable you want to grow, and will influence your decision about the kind of vegetable you're going to plant — all carrots aren't alike, and there are hundreds of different tomato varieties.

Can you grow it? Not all vegetables grow satisfactorily in ail climates. Some vegetables like it hot; some refuse to grow in hot weather. Some vegetables flourish when it's cold; others just shiver and die. Certain plants go from seed to harvest in a couple of months and will grow almost anywhere in the United States — green beans and some kinds of lettuce are among these obliging vegetables. Others are very picky and need a long stretch of warm or cool weather. You have to take the plant's needs into consideration before you can make a decision on whether or not it's a practical choice for your home garden.

Do you have room for it? There are plants that are rather like large pets — they're very endearing, but you just can't live with them because they're too big. You want to grow vegetables that will give you a reasonable amount of produce in the space that you have available. Some vegetables — especially some vining crops like pumpkins — need a great deal of room and give you only low yields, so they're not a practical choice in a small home garden. And if you're growing an indoor container garden, you'll do fine with cabbages in flowerpots, but there's simply no place you're going to put a healthy watermelon vine or a Jerusalem artichoke.

Is it worth the bother? Some vegetables require very little nurturing, and you can grow them with a minimum of toil. Others require special attention and need to be babied. Celery and cauliflower, for example, have to be blanched — blanching is a process that deprives the plant (or part of the plant) of sunlight in order to whiten it and improve its flavor, color, or texture. Before choosing a crop that's going to need special handling, be sure you really want to give it that much attention. Some crops, too, are bothered a lot by insects or plant diseases — corn is one of them. If you're not willing to deal with these

problems as they occur, this type of crop is going to cause you more disappointment than satisfaction.

Are you trying to save money? Another factor to consider when you're deciding what to plant is the practical matter of economics — is the vegetable worth growing, or would it be cheaper to buy it? Some vegetables are readily available and inexpensive to buy, but would produce only low yields from a large space if you grew them in your garden. Corn, for instance, is inexpensive to buy when it's In season, but in your garden it needs a lot of growing space and often only gives you one harvestable ear from a whole plant. You may decide not to grow corn and settle instead for a crop like endive, which is expensive in the store but as easy as leaf lettuce to grow. Potatoes, too, are readily available and fairly inexpensive to buy, but they're space-hungry in the garden. You might like to plant an asparagus bed instead— it requires a little initial work, but gives you a gourmet crop for years afterwards.

The economy question, however, is not clear-cut. The fact remains that the vegetables you pick fresh from your own garden taste a whole lot better than the ones you buy in the store, so saving money may not be your prime purpose in growing them. You may be perfectly willing to give up half your garden (or all your balcony) in order to have a couple of ears of wonderful, milky, homegrown corn come harvesttime. You may consider the delicious flavor of fresh carrots a more Important issue than the fact that store-bought ones are inexpensive. The only way you can get corn from the garden to the table in a matter of minutes is to grow your own, and the freshest possible carrots are the ones you pull out of the backyard at dinner time. These are judgments you make yourself, and they're just as important—if not more so — than whether or not a crop is easy to grow, economical in its use of space, or will save you money.

How much is enough — or too much?

Your initial decision about the vegetables you'd enjoy growing and eating—and that you think you can grow successfully In the conditions you have to deal with — is the first step to planning a well-thought-out, productive vegetable garden. But this is the point where you discover that you still have very little Idea of how much of each vegetable to grow. You know you want to eat some of your crop and freeze, pickle, or preserve some. But how many seeds should you plant to enable you to achieve those ends? Again, advance planning can help you avoid getting swamped with squash or overrun by radishes — it's amazing how energetically your plants will prosper under your care and how large a plant a little seed will produce.

Planning for the yield you want

Some gardeners start off in an orderly manner by planting all their vegetables in rows of the same length, but space means something different to a carrot and a cauliflower. A 10-foot row of broccoli will give you a manageable amount of produce; a 10-foot row of parsley will provide enough for you and the entire neighborhood, but it isn't a big problem because you can freeze or dry parsley and use it all year around. A 10-foot row of radishes, however, can be a big mistake — no family can eat all those radishes, and they don't store well, so you could end up with a lot of wasted radishes. Cucumbers sprawl all over the place and need a lot of room; carrots are fairly picky about soil conditions, but they do stay where you put them. So you have to estimate how productive your plants are likely to be. The description of individual vegetables in Part 2 will help you estimate how many plants to grow.

Plan how to use your crop

Garden space, storage space for preserved vegetables, storage space for preserving equipment, family food preferences, your own preferences, your local climate, the energy costs, time involved in preserving, and the help available (if any), are all points you need to consider when you're deciding how much of a certain vegetable you want to grow. Before you plant large amounts of a vegetable, plan what you're going to do with the vegetables you can't eat at once. Check each vegetable's storage potential — detailed information on storing and preserving Is given in Part 3— and take into account whether or not you want to go to the trouble of storing or preserving what you don't eat immediately. Some people find canning, freezing, or drying their home crop a most pleasurable activity. Others don't have time or just don't like doing It. So counting your chickens before they're hatched is a vital part of your planning, and something to keep in mind even way back In the winter when you're spending a bleak December day studying your seed catalogs. Come summer, it will be too late.

Do you want to freeze, can, dry, pickle, or store?

There's more than one way to preserve a crop. You can freeze, can, dry, or make preserves and pickles. You can construct a cold storage area or a root cellar in the basement. You can make a storage pit in the

garden. Some vegetables are very obliging. For Instance, extra green beans are no problem because you can freeze, can, dry, or pickle them. And some root vegetables are best stored in the ground for as long as possible — just go out and dig them up when you're ready to use them. If you have a big family and a lot of garden space, you may need to use several different methods to make the most of your crop. If you have only a small garden and a small family, perhaps freezing alone is all you need to consider. Read through the introductory sections on each method of preserving in Part 3, so you're aware of the space and equipment involved and the advantages and disadvantages of each method. Consider also the climate where you live and how much time you're able and willing to spend on preserving. At this point, as in your initial choice of which vegetables to grow, personal preferences are important. If your family hates turnips and only likes carrots raw, it's hardly going to be worthwhile to have a root cellar. If you're always on the run, it's pure fantasy to imagine yourself making preserves come fall. You may also want to investigate sharing the crop — and the work. If you live in a community of gardeners you may find it possible to get together on preserving projects, sharing crops, equipment, and labor.

CLIMATE: HOW WHERE YOU LIVE AFFECTS WHAT YOU GROW

Plants, like people, have definite ideas about where they like to live. Like people, they flourish in congenial conditions and become weak and dispirited if life is too difficult for them to cope with. Unlike people, however, plants can't take practical steps to improve their homesite — they can't up and move, and they can't protect themselves against adverse conditions. You, the gardener, are largely responsible for how well your plants do in the climatic conditions you offer them, and you'll save yourself a lot of frustration and disappointment if you have some understanding of how climate affects your garden and if you choose your crops acco^ing to your climate.

What gardeners mean by a "growing season"

Throughout this book you'll encounter references to the "growing season." The growing season is, essentially, the length of time your area can give plants the conditions they need to reach maturity and produce a crop. The growing season is measured in terms of the number of days between the last frost in spring and the first frost in fall. In general terms. these two dates mark the beginning and end of the time in which plants grow from seed to maturity. Some areas never have frost at all and use their dry season as their "winter." In these areas, however, it's still possible to use hypothetical "frost" dates. So the length of your growing season is (technically) totally dependent on your local climate. When you plant a vegetable depends on how well that vegetable handles extremes of temperature.

The dates on which a certain area can expect to have the last spring frost and the first fall frost are called the "average date of last frost" and the "average date of first frost," respectively. They are generally used as reference points for planning and planting vegetables, but they're not infallible. They do however, give you a fairly accurate guide as to which vegetables will do best in your area, and they are the reference points most generally used in this book. As with every other aspect of gardening you need to be a little bit flexible. The chart at the end of this chapter lists the average dates of first and last frosts in major cities throughout the United States. If you live within 10 miles of a city listed, you can take these dates as accurate; three or four days either way is just as acceptable, so don't feel you must do all your planting exactly on the one listed day. All these dates are average, and the weather can always spring surprises. If you live a long way from a listed city or are for any reason unsure when to plant, call your local Cooperative Extension Service or Weather Bureau for advice. The Cooperative Extension Service is a joint effort of the United States Department of Agriculture and the state land-grant colleges and universities. The service's local office is an invaluable resource for the gardener, and a list of offices throughout the country appears in Part 4.

Climatic or "hardiness" zones

The average date of last frost is not the only reference point used to determine when to plant a garden. At one time or other gardeners have made that date dependent on everything from "climatic zones" to the phases of the moon. Climatic zones are the small maps you find on the back of seed packages; they divide the United States into zones or areas with fairly similar climates. They're probably far more accurate references for planting than phases of the moon, but they're very general, and they don't tell the whole story. There are many incidental — sometimes almost accidental — conditions that can cause changes in climate within a climatic zone.

The climatic zone map in the seed catalog or on the back of a seed packet can give you a broad idea of

how a vegetable (or vegetable variety, because carrots, tomatoes, and other popular vegetables don't by any means conform to a stereotype) will do in your area. Climatic zones, however, don't take into account the variations that occur within an area which, if you go by the book, has the same climatic conditions prevailing over many square miles. For instance, if the balcony of your downtown apartment faces south, you may be able to grow vegetables on it that would never survive in a north-facing garden of your apartment block. Lots of large buildings, a nearby body of water like a lake, or even heavy traffic can significantly alter the temperature (and pollution level) in a small garden. So, given all these imponderables, it's safer to judge how well a vegetable will grow by considering its own tolerance to certain conditions, rather than by a hard-and-fast map reference.

How '^hardiness" affects your garden plan

The way a vegetable type reacts to climatic conditions — heat, cold, moisture, and so on — determines its "hardiness." It's another way of saying how tough it is, but the term hardiness is used specifically to indicate how well a plant tolerates cold. Before you study how climate affects your garden, it's as well to consider which hardiness categories certain vegetables fall into. The hardiness of each kind determines how that particular vegetable will fit into your growing season.

The vegetables that are grown in a home vegetable garden fall into one of four hardiness categories: *very hardy, hardy, tender,* and *very tender.* The date on which you can safely plant each vegetable in your garden depends on which hardiness category it falls into.

Very hardy vegetables can tolerate cold and frost and can be planted in the garden four to six weeks before the average date of last frost. They include asparagus, broccoli, Brussels sprouts, cabbage, cauliflower, collards, Chinese cabbage, horseradish, Jerusalem artichokes, kale, kohlrabi, leeks, lettuce, onions, peas, rhubarb, rutabagas, and shallots; and the herbs chives, garlic, mint, tarragon and thyme.

Hardy vegetables can handle a certain amount of cold and frost and can be planted two to three weeks before the average date of last frost. They include beets, cardoon, carrots, celeriac, celery, chard, chicory, dandelion, endive, parsnips, Irish potatoes, radishes, salsify, turnips; and the herbs anise, borage, fennel, marjoram, oregano, parsley, rosemary, and savory.

Tender vegetables don't like cold weather and can be planted on the average date of last frost; you will need to protect them in some way if there's a late frost. These vegetables include most beans, cress, mustard, sorrel, corn, tomatoes; the perennial artichokes; and the herbs basil, caraway, chervil, coriander, dill, sage, and sesame.

Very tender vegetables will not survive any frost and must be planted after the soil has warmed up in the spring; they can be planted two to three weeks after the average date of last frost. These vegetables include lima beans, cucumbers, eggplant, muskmelons, okra, peanuts, peppers, pumpkins, winter and summer squash, and watermelons.

Gamblers can take a chance and plant earlier than these dates, but usually this gambling will not pay off. Even if you beat the odds and your plants are not frozen out, they will probably be inhibited by the cold soil, and they won't grow any faster than they would if you planted them at the proper time.

THE CONDITIONS THAT ADD UP TO CLIMATE

The degree to which the successful growing of each vegetable type is dependent on hot and cold weather conditions indicates that temperature is the most important aspect of climate to consider when you're planning your vegetable garden. At this point it's helpful to take a good look at how temperature and other basic climatic conditions affect your garden. Rainfall and sunlight also play a most important part in how your garden grows, so let's take a look at these three elements and how they work with your plants.

How temperature affects plant growth

Average day-to-day temperatures play an important part in how your vegetables grow. Temperatures, both high and low, affect growth, flowering, pollination, and the development of fruits. If the temperature is too high or too low, leafy crops may be forced to flower prematurely without producing the desired edible foliage. This early flowering is called "going to seed," and affects crops like cabbages and lettuce. If the night temperatures get too cool it may cause fruiting crops to drop their flowers — reducing yields considerably; peppers may react this way to cold weather. Generally, the ideal temperatures for vegetable plant growth are between 40° and 85°F. At warmer temperatures the plant's growth will increase, but this growth may not be sound structural growth. At lower temperatures the plant's growth will slow down or stop altogether.

Vegetables have different temperature preferences and tolerances and are usually classified

as either cool-season crops or warm-season crops. Cool-season crops are those like cabbages, lettuce, and peas, which must have time to mature before the weather gets too warm; otherwise they will wilt, die, or go to seed prematurely. These vegetables can be started in warm weather only if there will be a long enough stretch of cool weather in the fall to allow the crop to mature before the first freeze. Warm-season crops are those vegetables that can't tolerate frost, like peppers, cucumbers, and melons. If the weather gets too cool they may not grow at all; if they do grow, yields will be reduced. Warm-season crops often have larger plants than cool-season crops and have larger, deeper root systems that enable them to go for relatively longer periods without being watered. Even though it is convenient to think of vegetables simply as either cool-season or warm-season crops, considerable differences can exist within each of these two groups.

The following lists offer a guide to cool- and warm-season crops. For specific planting dates for each type of vegetable, refer to the chart at the end of "Planting Your Garden."

Cool-season vegetables include: globe artichokes, asparagus, beets, broad beans, broccoli, Brussels sprouts, cabbage, carrots, cauliflower, celeriac, celery, chard, chicory, Chinese cabbage, collards, cress, dandelion, endive, cardoon, horseradish, Jerusalem artichokes, kale, kohlrabi, leeks, lentils, lettuce, onions, parsnips, sweet peas, white potatoes, radishes, rhubarb, rutabagas, salsify, shallots, sorrel, spinach, and turnips. Cool-season herbs include: anise, borage, chive, dill, oregano, parsley, peppermint, rosemary, sage, savory, spearmint, tarragon, and thyme.

Included among the warm-season vegetables are: dry beans, lima beans, mung beans, snap or green beans, chayote, chick peas, corn, cucumbers, eggplant, muskmelons, mustard, okra, black-eyed peas, peanuts, peppers, sweet potatoes, pumpkins, soybeans. New Zealand spinach, summer squash, winter squash, tomatoes, and watermelons. Warm-season herbs include: basil, caraway, chervil, coriander, marjoram, and sesame.

Rainfall: How plants use water

The amount and timing of the rainfall in your area also affects how your vegetables grow. Too much rain at one time can wash away seeds or young seedlings and damage or even kill mature plants. A constant rain when certain plants are flowering can reduce the pollination of the flowers and reduce yields. This can happen to tomatoes, peppers, beans, eggplant, melons, pumpkins, and both summer and winter squash. A constant rain can also tempt the honey-bees to stay in their hives instead of pollinating the plants; again, yields will be affected.

Too little rain over a period of time can slow down plant growth and kill young seedlings or even mature plants. Limited moisture in the air can also inhibit pollination and reduce the yields of some vegetables. Too little rain can be more easily remedied than too much. If it rains too little, you can water the garden. If it rains too much, all you can do is pray.

Rainfall is probably the easiest climatic condition to improve. Farmers have worried and complained about the rainfall since the beginning of agriculture. If you've got thousands of acres of land and no control over the available water it can be very frustrating — if not a disaster. Since the home garden is usually small and fairly manageable in size, you can do something to regulate how much water it gets. If you don't get enough rain when you need it, you can simply water, and there are many different methods you can use. These are described in detail in "Caring for Your Garden." Too much rain can be more difficult to deal with, and here you need to take preventive measures. The better drained your soil is, the better it will be able to deal with too much water. When you select the site for your garden, avoid any area that is low-lying or poorly drained. If that's the only site that you have for the garden — and you're really serious about gardening — you can improve it by installing drainage tiles. This can be a costly and complicated process, so consider it only as a last resort.

Light: Your plants can't live without it

The third major climatic factor is light, and it's an important factor to consider when you plan your garden. Sunlight — or some type of light — provides energy that turns water and carbon dioxide into the sugar that plants use for food. Green plants use sugar to form new cells, to thicken existing cell walls, and to develop flowers and fruit. The more intense the light, the more effective it is. Light intensity, undiminished by obstructions, is greater in the summer than in the winter, and greater in areas where the days are sunny and bright than in areas where it's cloudy, hazy, or foggy. As a rule, the greater the light intensity the greater the plants' production of sugar — provided, of course, that it's not too hot or too cold and the plants get the right amount of water.

If a plant is going to produce flowers and fruit, it must have a store of energy beyond what it needs just to grow stems and leaves. If the light is limited, even

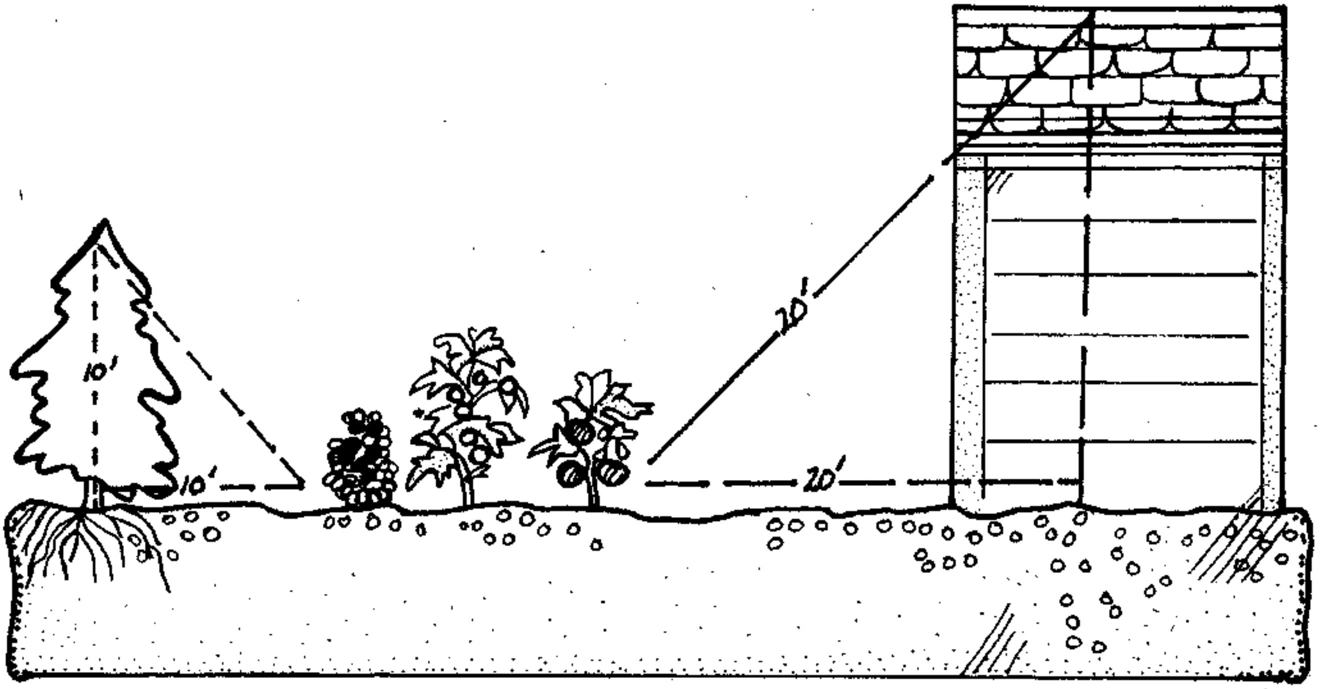
a plant that looks green and healthy may never produce flowers or fruit. This can be a problem with vegetables like tomatoes, where you want to eat the fruit. With lettuce, where you're only interested in the leaves, it's not an issue. All the same, all vegetables need a certain amount of light in order to grow properly, and without it all the watering, weeding, and wishing in the world will not make them flourish.

How day length affects your crops. Many plants, including tomatoes and many weeds, are not affected by day length — how long it stays light during the day. But for many others the length of the day plays a big part in regulating when they mature and flower. Some plants are long-day plants, which means they need 12 or more hours of sunlight daily in order to initiate flowering. Radishes and spinach are long-day plants, and this is the main reason they go to seed so fast in the middle of the summer when the day length is more than 12 hours. If you want to grow radishes or spinach in midsummer, you have to cover them with a light-proof box at about 4 p.m. every afternoon to fool them into thinking the day's over. Other plants are short-day plants and need less than 12 hours of light to initiate flowering; soybeans and corn are examples. Many varieties of short-day plants have been bred to resist the effects of long days, but-most will still flower more quickly when the days are shorter.

How much sunlight is necessary? Vegetables grown for their fruits need a minimum of six to eight hours of direct light each day. Less light frequently means less than a full crop. It's very frustrating to try to grow tomatoes, peppers, or eggplants in the shade; they'll often produce a good, green plant without giving you anything at all in the way of a vegetable. Crops that are grown for their roots and leaves, however, will give you satisfactory results in light shade.

Root crops, such as beets, carrots, radishes, and turnips, store up energy before they flower and do rather well in partial shade, especially if you don't compare them with the same crop grown in full sun. Plants like lettuce and spinach that are grown for their leaves are most tolerant of shade; in fact, where the sun is very hot and bright they may need some shade for protection. Only mushrooms and sprouts can be produced without any light at all.

Making the most of your garden light. If you have a choice of where to grow your vegetable garden, don't put it in the shade of buildings, trees, or shrubs. The accompanying illustration shows how to give plants enough light. Remember that as well as shading an area, trees and shrubs also have roots that may extend underground well beyond the overhead reach of their branches. These roots will compete with the vegetable plants for nutrients. Stay clear especially



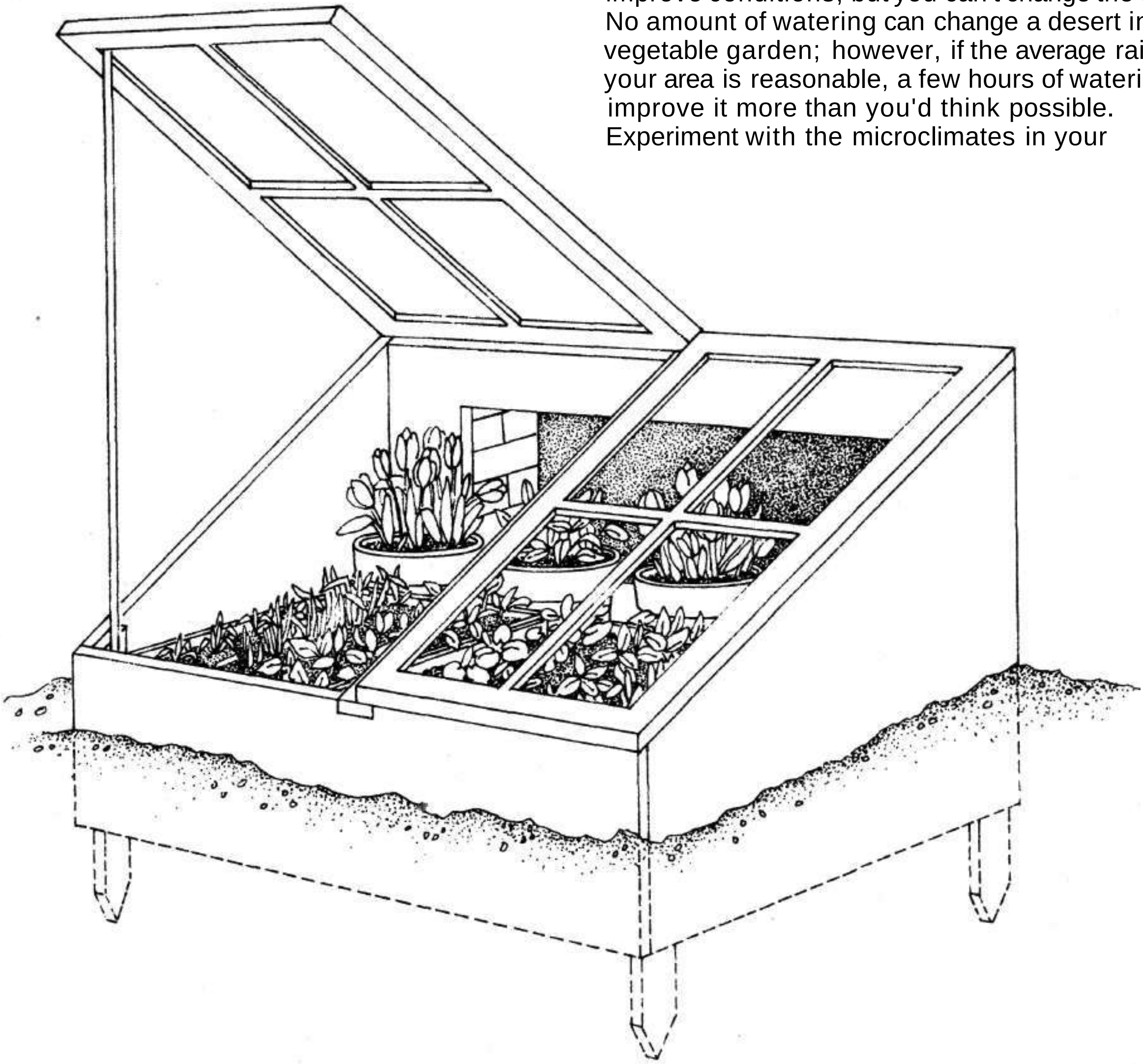
Your plants must have enough light, so plant where they won't be overshadowed by trees, shrubs, or buildings.

of walnut trees; they produce iodine, a growth retardant that will stunt or kill the vegetable plants in your garden. Go out and stand in your garden to see just how the light falls. Walk around and find where the light fails to penetrate. This knowledge will be very useful when you come to planting time.

Providing shade from too much sun. Most vegetables need full sun for best growth, but young or newly transplanted plants may need some protection from bright, direct sunlight. It's easier for you, as a gardener, to provide shade where there's too much sun than to brighten up a shady area. You can, for instance, plant large, sturdy plants like sunflowers or Jerusalem artichokes to provide a screen, and you can design your garden so that large plants and small ones each get the light they need. You can also shade young plants with boxes or screens when necessary. However, too little sun is far more serious a problem in a garden than too much.

How to make the most of your climate

Whatever the climate is like where you live, you are not entirely at the mercy of the elements. There are certain improvements you can make to enable you to grow some vegetables that would not normally do well in your area. Don't expect miracles — you can improve conditions, but you can't change the climate. No amount of watering can change a desert into a vegetable garden; however, if the average rainfall in your area is reasonable, a few hours of watering can improve it more than you'd think possible. Experiment with the microclimates in your



Extend your gardening season with a cold frame that uses solar heat to warm your plants.

neighborhood and your yard; it may be possible to increase your growing season and grow vegetables that need a longer growing season than your climate technically provides. Microclimates may also enable you to grow tender perennials that would not normally survive the winter in your area. The secret is to make the most of the conditions that exist in your garden. Experiment — plant a tender vegetable close to the south wall of your house; it may not get all the sun it needs, but protection from wind and cold may help it grow where it wouldn't grow at all in the open garden.

Another way to frustrate the natural temperature limitations of your local climate is by using transplants Instead of seeds in spring. Transplants are young plants started from seed indoors or in a warm place and set out in the garden later; this gives you a head start on your growing season, but you can't do it with all vegetables. Growing transplants is discussed in detail in the chapter, "Planting Your Garden," along with ways of protecting plants against extremes of temperature.

Other weather conditions can also affect the yields of your vegetable crops. Dry, windy days and cool night temperatures (a 10°F drop from day temperatures) can cause fruiting crops — peppers, for instance — to drop their flowers before they're pollinated; this means you lose a lot of your crop. You can avoid it to some extent by putting up some type of windbreak to protect the crops from drying winds. It's comforting to remember that although you can't make major changes in your climate, you can certainly do a lot to help your plants make the most of their environment.

Cold frames and hot frames: Extending your gardening season

If you have the space for it, a cold frame — a glass-enclosed growing area outside — can add an extra dimension to your garden. It's an ideal place to start hardy annuals and perennials or to put plants in the spring to harden them for the rigors of outdoor life. When you have started vegetables inside, especially the cold-tolerant ones, you can move them to a cold frame and give them the benefit of much more light in a protected place. And since a cold frame uses solar heat, it qualifies as an energy-saving device. The hardy herbs, radishes, lettuces, and other greens can be grown in a cold frame during a good part of the year, even in the North.

A cold frame, often called a "poor man's greenhouse," can be made from scrap lumber and old storm windows. It should not be too deep from front to back or you'll have trouble getting plants in and out. Cold frames capture solar heat, and if they slant to the south they can take advantage of the greatest amount of sun.

On the days when the sun is bright you may have to provide some shade to keep the plants from sunburning, or lift the cold frame windows to keep plants from steaming. If the sun is bright enough the temperature inside a cold frame can reach 85° to 95°F when the temperature outside is only 15°F. But on cold nights when the temperature drops below freezing, a cold frame will need some extra protection. An old quilt or blanket under a tarp is a good cover. If you have nothing else newspapers will do, although they are a bit harder to handle.

If a cold frame sounds like something you'd like to try, look around for some turn-of-the-century garden books. These provide excellent step-by-step instructions for building and using cold frames and offer suggestions on how to do all kinds of serious cold-frame growing.

Hot frames are a bit more challenging than cold frames, and the opportunities for frustration are multiplied. In hot frames, heat is provided either by rotting manure (the classic system) or by electricity (the modern way). Decomposing cow, horse, and mule manure do not work the same way, and the heat of decomposition depends on the age, the kinds, and amount of litter present. When you're using manure there are no thermostats or controls, except the gardener's know-how. Electricity is much easier but a lot more expensive than manure, and there is still work for the gardener to do.

If you have a basement window facing south with some space outside, you can incorporate it into your hot or cold frame. It will also provide a basic" course in the management of a greenhouse — the next step in gardening addiction.

HOW TO GET YOUR GARDEN STARTED: PUTTING THE THEORIES TO WORK

Up to this point, most of your garden planning has been theoretical. You've given thought to the vegetables you want to grow, what you're going to do with them, and how much you need to grow. You've got an idea of how the climate in your area will influence your final choice of vegetables. You're beginning to understand your microclimate — how growing conditions in your own yard may differ from the general climate of your area. Now you're ready to start getting your plans on paper, but as soon as you open the seed catalog, confusion strikes again. You want to grow your own corn, tomatoes, lettuce, and carrots — but what kind?

Finding the varieties suited to your area. Because there are so many varieties, it can be very difficult to choose the right one. Part 2 of this book describes the individual vegetables and their cultural requirements and lists some of the best and most widely used varieties. But in many cases the varieties listed represent only the tip of the iceberg. Where a large number of varieties are available (as with corn or tomatoes) or where success depends as much on growing conditions as on variety (as with onions), your best bet is to get in touch with your local Cooperative Extension Service. The service's experts will be able to tell you exactly which varieties will do best in the growing conditions that exist in your part of the country. A complete list of Cooperative Extension Services is given in Part 4, together with detailed information on how to get your gardening questions expertly answered by their qualified horticulturalists.

Guaranteed varieties: The All-America Selection. Another way to find the most reliable varieties for your area is through the All-America Selections. This is a nonprofit organization of seedsmen who develop and promote new varieties of vegetables and flowers. The organization awards gold, silver, or bronze medals to vegetable varieties that have been proven to produce reliable results in most areas of the United States. If a vegetable is listed in your seed catalog as an All-America Selection, you can be sure that it has been tested by growers all over the country and that it's a good bet for your own garden. The organization does not bestow its seal of approval lightly — only one or two vegetable varieties win a gold medal in any year.

Experiment with different varieties. Remember, too, that you don't always have to play by the rules. You can plant more than one variety of a vegetable and decide for yourself which one is best suited to your palate and your garden. You can also extend your harvest by planting varieties that mature at different times. Experimenting is a good part of the fun of growing a vegetable garden.

Dates: When to plant and when to harvest

Selecting the varieties you're going to grow gives you some hard information with which to work. You now know when to plant your vegetables. The hardiness chart in "Planting Your Garden" will tell you to which category — very hardy, hardy, tender, very tender — a vegetable belongs and when to plant it. Now is the time to decide whether to use seeds or transplants. Transplants are young plants started from seed indoors or in a warm place (like a hot frame) and planted in the garden when the weather's warm enough. By planting transplants you can often get a head start on your growing season and avoid some of the limitations placed on you by your area climate. Not all vegetables, however, take kindly to being transplanted. Full information about growing vegetables from transplants — including what to plant and when — is given in "Planting Your Garden."

It's important to plan your planting dates accurately. It's also important to know when your crop will be ready for harvest. The number of days it takes a plant to reach maturity varies according to type and to varieties within a type.

Each vegetable variety has its "days to maturity" listed in the seed catalog. Take a calendar, and see how the dates fall for the crops you're thinking of growing. For instance, "jade Cross Hybrid" Brussels sprouts take 95 days to maturity. They're very hardy, so you can plant them six weeks before your last spring frost. If your area expects its last frost at the end of April, you can plant your Brussels sprouts in the garden in mid-March, and they'll mature in mid-June. They're a cool-season vegetable, so as long as the weather in your area won't be sizzling hot by mid-June, you should do well with them. In this way, work out all the dates on which you can expect to harvest your vegetables, and make a list of them. This will give you a chance to make changes if, despite all your planning, you've got too large a crop maturing at the same time. It will also give you some ideas about "pacing" your crop.

Pacing your harvest for best yield

Deciding when to plant involves more than avoiding killing frosts. It also means pacing your • planting so you get maximum yields from limited space. You can harvest some crops gradually, enjoying them for a long period of time; others mature all at once. This takes careful planning. You have to have a good idea of how long it will take your vegetables to mature and how long the harvest will last. It will also take some self-control. The temptation to plant rows of everything at once is great.

Planting short rows. A simple way to pace your harvest is to plant only short rows or partial rows. Planting short rows is probably easier; you may feel more comfortable with a complete row, even if it is short. A 10-foot row looks short, but 10 feet of radishes ready to eat at once is more than most people can handle. Ten feet of parsley or garlic may be more than enough for the whole neighborhood. You can freeze parsley and dry the garlic, but what can you do with all those radishes? Unwanted excesses of crops can be avoided if you divide your seeds into groups before going out to plant. Put them

in "budget" envelopes to be planted on definite dates later on in the season but before the early crops are harvested. For instance, plant lettuce every two weeks. This way you can have vegetables all season, rather than glut followed by famine.

Using several varieties. Another way to pace your harvest is to plant several varieties of the same vegetable that mature at different rates. For instance, on the average date of last frost plant three different tomato varieties: an early variety that will mature in about 60 to 70 days; a midseason variety that will mature in about 75 to 80 days; and a late variety that will mature in about 80 to 90 days. By planting these three varieties on the same day you have spread your harvest over a 30- to 50-day period, instead of a 10- to 20-day period.

Succession planting. With careful planning you may also be able to save garden space and get two or more harvests from the same spot by succession planting. After early-maturing crops are harvested, you clear a portion of the garden and replant it with a new crop. Plant so that cool-season crops grow in the cooler part of the season, and warm-season crops can take advantage of warmer weather.

One example of succession planting is to start off with a fast-growing, cool-season crop that can be planted early—lettuce, spinach, and cabbage (cole) family vegetables are good examples. Replace these by warm-weather crops like New Zealand spinach, chard, corn, okra, and squash. Then in fall make another planting of cole crops, or put in root crops like turnips or beets.

In a small area, one simple plan is to start off with spinach, which is very hardy but hates hot weather, and replace it with heat-tolerant New Zealand spinach. Despite their different temperature requirements, the two can double for each other in taste, and you get spinach all season long.

You can also make double use of trellis space — a big plus in a small garden. Plant early peas, replace them with cucumbers, and after harvesting your cucumbers, plant peas again for a fall crop.

Companion planting. This is another way to double up on planting space. This you do by planting short-term crops between plants that will take a longer time to mature. The short-term crops are harvested by the time the longer-season crops need the extra room. A good example of this is to plant radishes between rows of tomatoes; by the time the tomatoes need the space, the radishes will be gone.

GETTING YOUR GARDEN ON PAPER

By this time you've put a lot of thought into your garden plan, and you've got some vital information and dates on paper — the names of the varieties you're going to plant and your planting and harvest dates. Now comes the real paperwork. The size of your garden depends on your interest in gardening and how much time you're going to be able to give to the garden. Some gardeners use every available inch of space; others use a small corner of their property — some, of course, don't have much choice, and this may be your case if you have a small garden to begin with or if you're gardening on a patio or balcony. The larger your garden, the more time and work it's going to need, so unless you're already hooked on gardening, it's probably better to start small and let your garden size increase as your interest in gardening and confidence in your ability develops.

Before you decide the exact dimensions, look at the list of the vegetables you've chosen and the amount you're going to grow of each one, and figure out if they're going to fit into the allotted space. You may see at once that you've overestimated what you can grow in the available space, so you'll have to do a little compromising between fantasy and reality. If your projected crops look as though they'll fit, you can now start drawing an actual plan.

Drawing a plot plan

This is the pencil-and-paper stage of planning, and if you use graph paper, you'll find it easier to work to scale. Don't be intimidated by all this talk about drawing and sketching. Your garden plan doesn't have to be a work of art — just a working document. Drawing to scale, however, is helpful. A commonly used scale is one inch on paper to eight feet of garden space — adapt the scale to whatever is easiest for you.

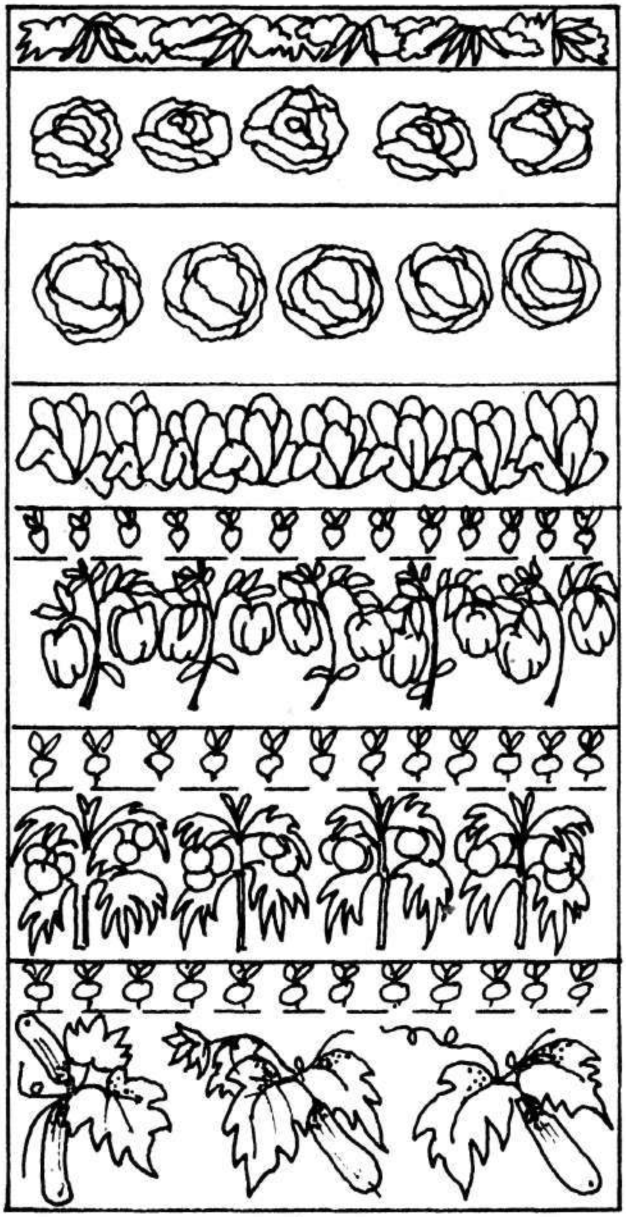
Draw up a simple plot plan giving your garden's measurements in all directions. Remember there's no law that says a garden has to be square or rectangular. Your vegetable garden can be round, triangular, curved, or any shape that fits your landscape and takes best advantage of the space you've got. When you've drawn the outline, sketch in all the nongrowing areas where you won't be able to " plant — trees, shrubs, sidewalks, sheds, buildings, walls, and the garage. Indicate any areas that are particularly shady or poorly drained and, therefore, aren't suitable for fussy crops.

Planning for three stages. It's helpful to draw three plot plans: The first will show the garden at planting time in the spring; the second will show the garden in the summer; and the third will show the garden in the fall. These plans will reflect the changes that take place in your garden when you harvest early

crops and replace them with new plantings. Make two copies of plans; keep one set inside where the plans will stay dry, clean/and legible. Use the other set in the garden — where it probably won't stay dry, clean, or legible for long. Plans have also been known to blow away in a spring breeze — a disaster if that's your only copy.

Putting the plants into the plan. Once you've outlined your plot and indicated all the nongrowing areas, get down to detail. Use the accompanying illustrations as a guide, and divide the plot among the vegetables you want to grow. The individual descriptions of vegetables in Part 2 give detailed information on the amount of space each vegetable needs for growth. For a quick check on spacing refer to the chart at the end of "Planting Your Garden." Don't try to economize on space — better a smaller number of healthy plants than a lot of starved ones.

Your vegetable garden in spring (5′ × 10′ plot)



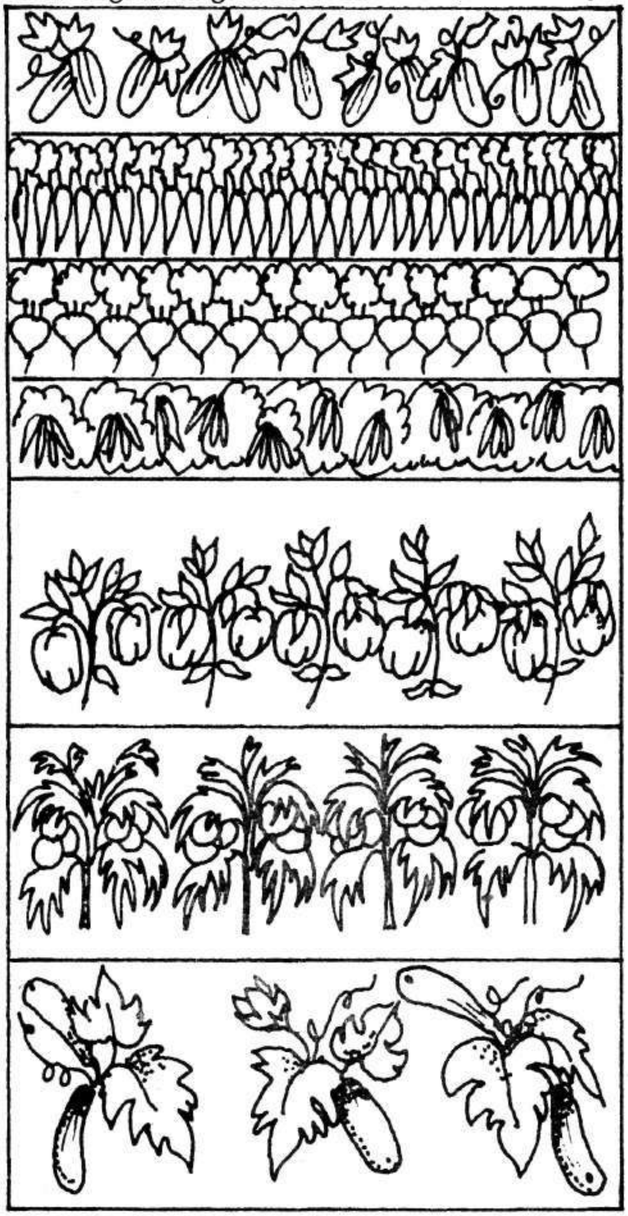
Vegetable	Planting dates	No. of plants	Space between plants
Peas* (Sugar Snap)	April 1-10	30	2″
Lettuce (Great Lakes)	April 10-25	5	12″
Cabbage** (Early Jersey Wakefield)	May 1-25	5	12″
Mustard Greens (Southern Giant Curled)	April 15-May 15	10	6″
Peppers** (Bell Boy)	May 20-June 1	5	12″
Tomatoes** (Better Boy)	May 20-June 1	3	20″
Spring radishes	April 15-May 1	30	2″
Summer Squash (Gold Rush Zucchini)	May 20-June 1	3	20″

* Growing on trellis
** Grown from transplants

Using your space efficiently. Take care in placing the vegetables. Place the taller plants on the north or northeast side of the garden so that as they grow they won't shade the rest of the garden. In a large garden where you've got plenty of space, the most convenient way to lay out the vegetables is in rows and hills. Straight rows and hills are easier to water, weed, cultivate, mulch, and fertilize. If you are going to use a rototiller, make sure the rows are large enough to accommodate the machine.

In smaller gardens it's more space-efficient to plant in wide rows or in solid blocks four to five feet wide. You must always be able to reach the center of a wide row comfortably from either side and to get between the short rows in a block. You can also save space in a small garden by using vertical space — growing vining crops up a trellis, for example, rather than letting them spread all over the

Your vegetable garden in summer (5′ × 10′ plot)



Vegetable	Planting dates	No. of plants	Space between plants
Cucumbers* (Market More)	June 15-20	10	6″
Carrots (Tendersweet)	June 15-20	30	2″
Beets (Early Wonder)	June 15-20	15	4″
Beans (Blue Lake)	June 10-15	15	4″
Peppers** (Bell Boy)	May 20- June 1	5	12″
Tomatoes** (Better Boy)	May 20- June 1	3	20″
Summer squash (Gold Rush Zucchini)	May 20- June 1	3	20″

* Growing on trellis
** Grown from transplants

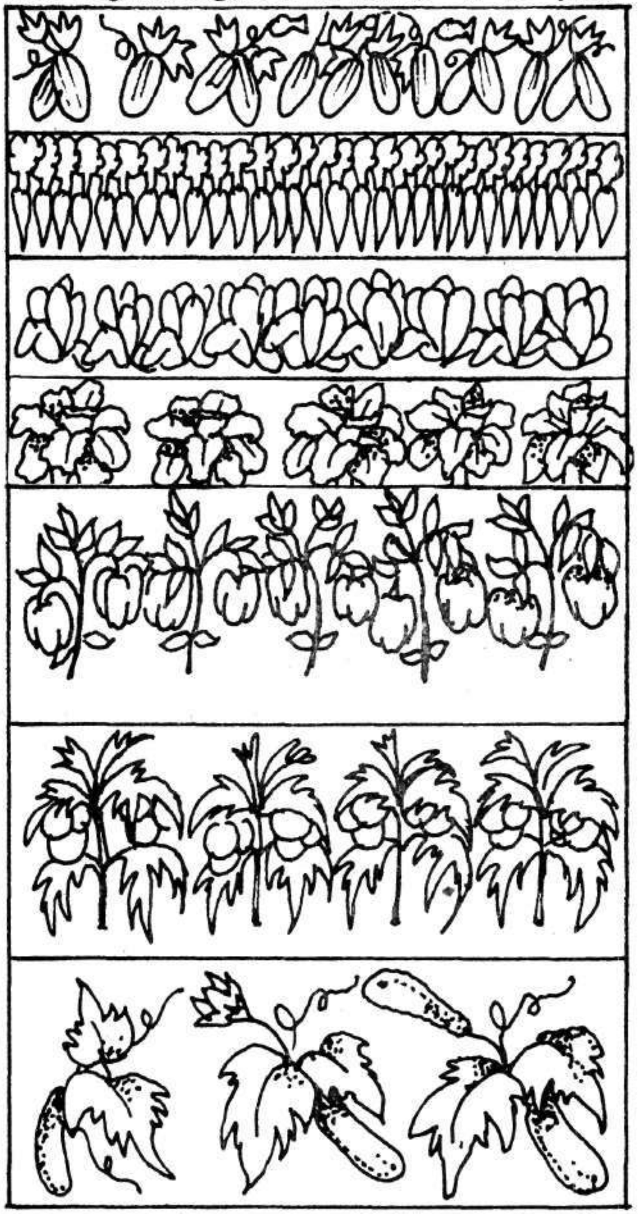
ground. Similarly, tomatoes can be staked or caged to contain their growth.

Adding dates and details. Finally, indicate whether you're planting from transplants or seeds, and add your planting dates for each vegetable; now your plan is complete, and you can see exactly what you'll be doing come spring. You'll also have compiled a good mental library of incidental knowledge about plants and how they grow and how your climate affects them; this knowledge is going to stand you in good stead throughout your growing season.

Recording the growth of your garden

If you're serious about gardening, you should keep records. Planning your records should be part of planning your garden. The better the planning, the more efficient use you'll be able to make of your time

Your vegetable garden in fall (5′ × 10′ plot)



Vegetable	Planting dates	No. of plants	Space between plants
Cucumbers* (Market More)	June 15-20	10	6″
Carrots (Tendersweet)	June 15-20	30	2″
Mustard greens (Southern Giant Curled)	August 15-20	10	6″
Collards (Vates)	August 15-20	12	5″
Peppers** (Bell Boy)	May 20-June 1	5	12″
Tomatoes** (Better Boy)	May 15-June 12	3	20″
Summer squash (Gold Rush Zucchini)	May 20-June 1	3	20″

* Growing on trellis
** Grown from transplants

and the more time you will have for enjoying the pleasures of your garden — not just keeping up with the chores. Build your records the same way you build your garden; profit from past mistakes, and Incorporate new ideas.

Start out with a ledger that has sewn-in pages. Don't write notes on slips of paper and expect to be able to find the one you want when you want It. Don't use a three-ring notebook, because if you can take a page out you will, and then you'll probably lose it. Your first entry m your record of your vegetable garden should be the plot you designed when you

Small-space gardeners can grow cucumbers in a hanging basket.

ordered the seeds. Mark this page with a paper clip so you can easily find it.

After the garden plot, you can keep a daily record of preparing the soil, planting, weeding, fertilizing, growing results (or lack of results); whether the harvest of each item was sufficient, too much, or not enough; and problems with weeds, bugs, or lack of rain. At the end of the growing season you'll have a complete record of what you did — and a record can be good for the morale.

Your record will list the plants that did well In your garden and those that didn't, and this information will give you the basics for planning next year's garden. Include in your ledger comments about the weather, varieties of plants that were productive or flopped, and notes about why you think some plants made it and others did not.

The computerized garden plan

If all this planning thoroughly intimidates you, don't abandon the idea of gardening. It's the age of technology, and you can have your entire garden planned by a computer. The computer uses some basic information that you supply about your garden and develops a complete, easy-to-use plan that includes all the information the novice gardener needs to grow a vegetable garden. The only problem involved in having your garden planned by a computer is finding out who offers the service. At the moment only a few states' Cooperative Extension Services and a few seed companies provide computerized planning services, but they're rapidly becoming popular and more available. Ask your local Cooperative Extension Service if they offer computerized planning or can put you in touch with some organization that does. You may also find such services advertised in gardening magazines.

CONTAINER GARDENING

In areas where there is little or no space, a well-organized container garden can produce substantial vegetables. A point to remember about container gardening: The small volume of soil in a raised bed will warm up faster in spring than the soil in your open garden. This gives you a longer growing season, because you can start your cool-season crops earlier. You can also bring plants inside if the temperature takes an unexpected plunge — this mobility is an advantage you obviously lack in an open garden.

Plan a container garden the same way as a small garden plot, making the best possible use of your vertical space. Use a trellis for vining crops and

stakes and cages for tomatoes or other semi-vining crops. If you're planting on a balcony, don't let any possible support go to waste. Position climbing plants where the railing provides a readymade trellis. There are also space-saving techniques unique to container gardens. You can use the vertical space of a container itself by planting in holes or pockets in the sides of the container. Growing some vining plants in hanging baskets will save space too, but be sure to place hanging baskets where they won't shade other plants. When you are growing a container garden, always select varieties that are suitable for container growing, and remember that containers dry out faster than a traditional garden, so you'll need to water more often. Plants growing in containers are also more affected by changes in temperature; you do have the advantage, though, of being able to move them to a more protected area or even inside on cool nights.

Essentially, planning a container garden is little different from planning an outdoor plot. The main difference may be in the varieties you choose — if you're planting in a confined space you're going to take a special interest in smaller varieties and plants with compact, contained growth habits. But basically, any plant that will grow in your garden will also grow on your balcony or patio.

Extending your garden indoors

If you don't have a garden or even a balcony, you can still have a container vegetable garden. Don't underestimate the number of vegetables that can be grown successfully indoors. Near a bright window that is not too warm, leafy vegetables, such as lettuce, parsley, and chives, will do nicely. Fruiting plants are worth a try, but they take a lot more light at a higher intensity; unless the window is very bright, the plants may grow but not produce. Cherry tomatoes in hanging baskets will sometimes grow in very bright windows, and sometimes plants can be brought in from outdoors and grown on for several months. Herbs are rewarding indoor-garden plants, and they go a long way in adding your personal touch to everyday eating.

Providing indoor lighting

If you have lights or if you have a place for putting lights, you can grow vegetables indoors without any sun at all. Lettuce does beautifully in the basement or the attic when grown under fluorescent light—usually these spots are not as warm as the rest of the house. Lettuce can also be grown in an apartment if you can find a spot where the heating is not very efficient or if you don't mind wearing a sweater.

Cucumbers will grow beautifully under artificial light. But just as long days will prevent flowering, so will long periods under artificial light. The best thing to do is experiment and find what does well for you. A timer can be useful in giving certain plants a dark resting period. Given lots of water, watercress works almost as well as lettuce under the lights. Instead of seeds, you can start with cuttings (the bottoms of some of those stems of fresh watercress you bought to indulge yourself).

Various possibilities for using vegetables as houseplants are discussed in the description of individual vegetables in Part 2.

Gardening in a greenhouse: A refuge for plants and gardener

With a greenhouse you can garden all year around and experiment with ail kinds of plants that you have little chance of growing out in the open garden. A greenhouse is also a nice, cozy, private place for the gardener whose gardening time Is often interrupted by demands from other family members. If you're going to buy and install a greenhouse, it's worth getting a good one. Greenhouses vary vastly in size, price, and construction and many companies supply them; not all of them, however, are well-designed and well-put-together, so you need to do some homework. The following are reputable sources that can provide you with basic information to help you make a choice. Some of them will design a greenhouse to fit your available space and specifications.

First and last frost dates for major cities in the United States

state and city	Average date of last frost	Average date of first frost	Number of days in growing season
Alabama			
Birmingham	March 19	November 14	241
Mobile	February 17	December 12	298
Montgomery	February'27	December 3	279
Alaska			
Anchorage	May 18	September 13	118
Cordova	May 10	October 2	145
Fairbanks	May 24	August 29	97
Arizona			
Flagstaff	June 8	October 2	116
Phoenix	January 27	December 11	317
Winslow	April 28	October 21	176
Arkansas			
Fort Smith	March 23	November 9	231
Little Rock	March 16	November 15	244
California			
Bakersfield	February 14	November 28	287
Fresno	February 3	December 3	303
Sacramento	January 24	December 11	321
Colorado			
Denver	May 2	October 14	165
Pueblo	April 28	October 12	167
Connecticut			
Hartford	April 22	October 19	180
New Haven	April 15	October 25	193
District of Columbia			
Washington	April 10	October 28	200
Florida			
Jacksonville	February 6	December 16	313
Orlando	January 31	December 17	319
Tallahassee	February 26	December 3	280
Tampa	January 10	December 26	349
Georgia			
Atlanta	March 20	November 19	244
Macon	March 12	November 19	252
Savannah	February 21	December 9	291
Idaho			
Boise	April 29	October 16	171
Pocatello	May 8	September 30	155
Illinois			
Cairo	March 23	November 11	233
Chicago	April 19	October 28	192
Springfield	April 8	October 30	205
Urbana	April 22	October 20	151
Indiana			
Evansville	April 2	November 4	216
Fort Wayne	April 24	October 20	179
Indianapolis	April 17	October 27	193

First and last frost dates for major cities in the United States (cont.)

state and city	Average date of last frost	Average date of first frost	Number of days in growing season
Iowa			
Des Moines	April 20	October 19	183
Dubuque	April 19	October 19	**184**
Kansas			
Concordia	April 16	October 24	191
Topeka	April 9	October 26	200
Wichita	April 5	November 1	210
Kentucky			
Lexington	April 13	October 28	198
Louisville	April 1	November 7	220
Louisiana			
Lake Charles	February 18	December 6	291
New Orleans	February 13	December 12	302
Shreveport	March 1	November 27	272
Maine			
Greenville	May 27	September 20	116
Presque Isle	May 31	September 18	110
Portland	April 29	October 15	169
Maryland			
Baltimore	March 28	November 17	234
Cumberland	May 1	October 10	163
Massachusetts			
Amherst	May 12	September 19	130
Boston	April 16	October 25	192
Nantucket	April 12	November 16	219
Michigan			
Detroit	April 25	October 23	181
Grand Rapids	April 25	October 27	185
Lansing	May 6	October 8	155
Minnesota			
Duluth	May 22	September 24	125
Minneapolis	April 30	October 13	166
Mississippi			
Jackson	March 10	November 13	248
Biloxi	February 22	November 28	279
Vicksburg	March 8	November 15	252
Missouri			
Columbia	April 9	October 24	198
Kansas City	April 5	October 31	210
St. Louis	April 2	November 8	220
Montana			
Billings	May 15	September 24	132
Glasgow	May 19	September 20	124
Havre	May 9	September 23	138
Nebraska			
Lincoln	April 20	October 17	180
Norfolk	May 4	October 3	152
Omaha	April 14	October 20	189

First and last frost dates for major cities in the United States (cont.)

State and city	Average date of last frost	Average date of first frost	Number of days in growing season
Nevada			
Las Vegas	March 13	November 13	245
Reno	May 14	October 2	141
New Hampshire			
Concord	May 11	October 1	143
New Jersey			
New Brunswick	April 21	October 19	179
Trenton	April 8	November 5	211
New Mexico			
Albuquerque	April 16	October 29	196
Santa Fe	April 23	October 19	179
New York			
Binghamton	May 4	October 6	154
Buffalo	April 29	October 23	178
New York	April 7	November 12	219
North Carolina			
Charlotte	March 21	November 15	239
Raleigh	March 24	November 16	237
Wilmington	March 15	November 19	274
North Dakota			
Bismarck	May 11	September 24	136
Fargo	May 13	September 27	137
Williston	May 14	September 23	132
Ohio			
Cincinnati	April 15	October 25	192
Cleveland	April 21	November 2	195
Columbus	April 17	October 30	196
Dayton	April 20	October 21	184
Toledo	April 24	October 25	184
Oklahoma			
Oklahoma City	March 28	November 7	223
Tulsa	March 31	November 2	216
Oregon			
Medford	April 25	October 20	178
Portland	February 25	December 1	279
Salem	April 14	October 27	197
Pennsylvania			
Harrisburg	April 10	October 28	201
Philadelphia	March 30	November 17	232
Pittsburgh	April 20	October 23	187
Rhode Island			
Providence	April B	October 27	197
South Carolina			
Charleston	February 19	December 10	294
Columbia	March 14	November 21	252
Greenville	March 23	November 17	239
South Dakota			
Huron	May 4	September 30	149
Rapid City	May 7	October 4	150
Sioux Falls	May 5	October 3	152

First and last frost dates for major cities in the United States (cont.)

state and city	Average date of last frost	Average date of first frost	Number of days In growing season
Tennessee			
Chattanooga	March 26	November 10	229
Knoxville	March 31	November 6	220
Memphis	March 20	November 12	237
Nashville	March 28	November 7	224
Texas			
Brownsville	February 15	December 10	298
Dallas	March 18	November 22	249
Houston	February 5	December 11	309
Plainview	April 10	November 6	211
Utah			
Blanding	May 18	October 14	148
Salt Lake City	April 12	November 1	202
Vermont			
Burlington	May 8	October 3	148
Saint Johnsbury	May 22	September 25	126
Virginia			
Norfolk	March 18	November 27	254
Richmond	April 2	November 8	220
Washington			
Seattle	February 23	December 1	281
Spokane	April 20	October 12	175
West Virginia			
Charleston	April 18	October 28	193
Parkersburg	April 16	October 21	189
Wisconsin			
Green Bay	May 6	October 13	161
La Crosse	May 1	October 8	161
Madison	April 26	October 19	177
Milwaukee	April 20	October 25	188
Wyoming			
Casper	May 18	September 25	130
Cheyenne	May 20	September 27	130
Sheridan	May 21	September 21	123

Vegetable rating guide

Write vegetable names here

B. Average to low potential yield

1. Asparagus, Brussels sprout, carrot, chicory, eggplant, endive, kohlrabi, leek, lima bean, onion, pepper, white potato .... +3
2. Cauliflower, muskmelon, sweet potato, pumpkin, watermelon .... +2
3. Globe artichoke, mung bean, corn, peanut, black-eyed pea, sweet pea, soybean, spinach .... +1

IV. Subtotal

Add plus points and subtract minus points. Divide the remaining points by two and enter the results here.

V. Personal preferences

Select only one point value.

A. Positive factors

1. You are curious about growing it .... +1
2. You like eating it and want to try growing it .... +2
3. You like it enough to go to a lot of trouble to grow it . +3

B. Negative factors

1. You are not particularly enthusiastic about either growing or eating it .... −1
2. No one in the family will eat it .... −2
3. No one in the neighborhood will eat it .... −3

VI. Analysis

Total your points for parts IV and V to find the rating for your vegetable as it could be grown in your area. If the rating is 5 or more, the vegetable is a good prospect. If the rating is 3 or 4, you might give it a try. If the rating is 2 or less, why bother?

Personal Gardening Calendar

Use this calendar to plan your gardening activities	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY
Start of growing season (average date of last spring frost)												
End of growing season (average date of first fall frost)												
Length of growing season												
Start hardy plants indoors (6-8 weeks before date to set out)												
Start tender plants indoors (6-8 weeks before date to set out)												
Plant very hardy plants and seeds outdoors (4-6 weeks before average date of last frost)												
Plant hardy plants and seeds outdoors (2-3 weeks before average date of last spring frost)												
Plant tender plants and seeds outdoors (on the average date of last frost)												
Plant very tender plants and seeds outdoors (2 weeks after average date of last frost)												
Clean up garden												
Plant next year's garden, order seeds												
Leave garden for vacation												

Your personal gardening calendar gives you a spot check on the important dates in your gardening season and lets you know how much you've already achieved and what is still left to do. Find the frost dates for your area and the length of your growing season from the chart earlier in this chapter. The hardiness chart at the end of "Planting Your Garden" will tell you which hardiness category your vegetables belong to and when to plant them.

There are a great many garden tools on the market. Some are necessary, some are helpful, and some are a complete waste of money. If you're a beginning gardener, approach all this equipment with caution—be sure that you're going to enjoy being a gardener before you spend a small fortune on tools. Remember, too, that one of your motives in being a gardener Is to save money by growing your own vegetables; you'll have to grow a lot of lettuce to pay for a $300 rototiller.

When you decide which tools you need, buy the best you can find and take good care of them. As in so many other activities, it's a long-term economy move to buy good equipment right away—ask any serious cook. Good tools work better and last longer than the cheap kinds that fall to pieces the first time you need them to do any real work.

The first test of a tool is how it feels in your hands. Is it well-balanced? Can you lift it when it's full as well as when it's empty? Gardeners and gardening tools come in different sizes and weights; since you'll be working together, you and your equipment should be compatible.

In caring for your tools, there are three basic rules that are often stated and seldom followed:

1. Clean your tools before putting them away. It may be a bore, but it's even more boring to have to clean them before you can use them again.

2. Have a regular storage place for each tool. Visitors will be impressed by your orderliness, and you'll be able to tell at a glance if you've put everything away or if you've left some small item out in the rain to rust.

3. Use each tool the way it was meant to be used. For instance, a rake—even a good-quaiity rake—^won't last long if you consistently use it to dig holes or turn soil. You've got a perfectly good spade for those tasks.

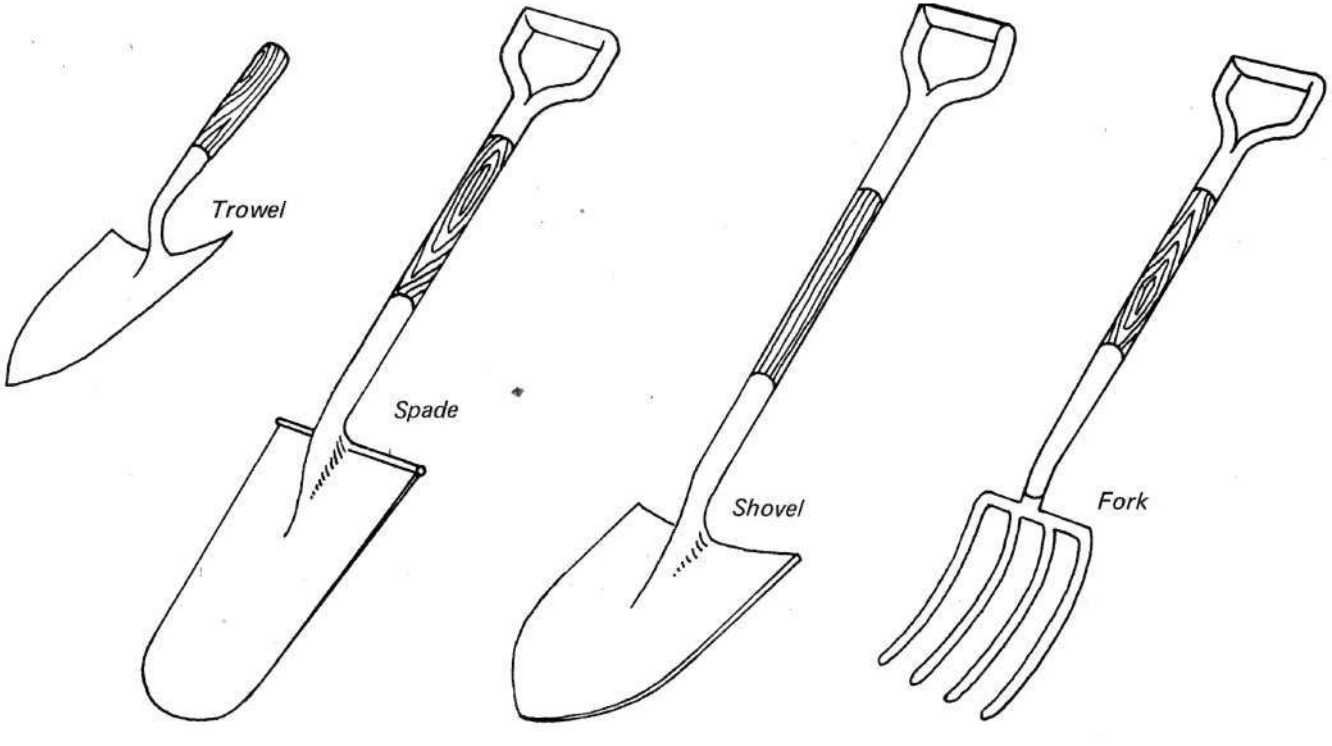
Follow these three simple rules and your tools will give you long, efficient, and economical service.

BASIC GARDENING TOOLS

The following are the basic tools of the gardener. You may not need them all. Consider the type and amount of gardening you do, and choose the implements that best suit your needs.

Shovel and spade. A shovel has a curved scoop and a handle with a handgrip. It's used for lifting, turning, and moving soil. A spade is a sturdy tool with a thick handle (and a handgrip) and a heavy blade that you press into the ground with your foot. The blade is usually flatter and sharper than the shovel's, and often squared off at the bottom. A spade is for hard digging work; it should be strong but light enough to handle comfortably. A nursery shovel or nursery spade is an excellent all-around tool in the vegetable garden.

Spading fork. A spading fork is also used for heavy digging, and its two to four prongs make it the best



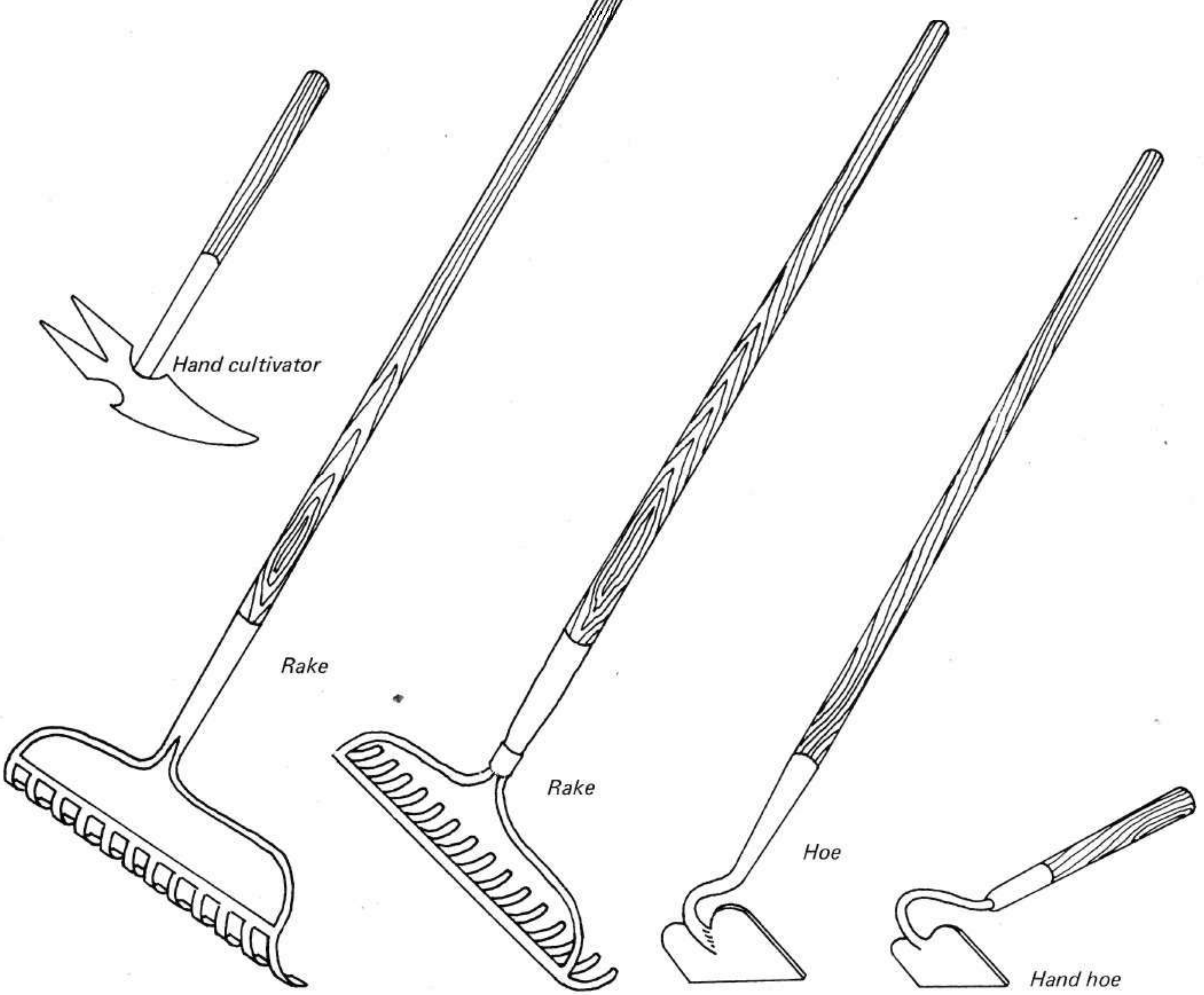
tool for breaking up compacted soil, lifting root vegetables, and digging weeds. The handle is sturdy and has a handgrip; your foot presses the prongs into the ground. Forks with flexible prongs are called pitchforks; the ones with sturdier, rigid prongs are called spading forks.

Rake. A rake with a long handle and short sturdy metal prongs is used for leveling and grading soil, stirring up the soil surface, and removing lumps, rocks, and shallow-rooted weeds. It's an essential tool for the home gardener. You can also get rakes with longer, flexible fingers. This type is not as versatile as the first type, but it's good for gentle cultivating, cleaning-up chores like raking the leaves, and collecting trash from between plants.

Hoe. The hoe is a tool with a flat blade attached at right angles to a long handle. It's used for stirring or mounding the soil and for making rows, and it's one of the gardener's most necessary tools. It's also used for cutting off weeds and cultivating.

Trowel. This is a short-handled implement with a pointed scoop-shaped blade. It can be used as a hand shovel or spade and is useful when transplanting young plants into the garden.

Hose. A garden hose is essential for carrying water to your garden. Hoses are usually made from rubber or vinyl; rubber is more expensive, but it's worth the initial extra cost because it's far more durable than vinyl and much easier to work with. Make sure your hose is long enough to reach comfortably to all parts of your garden. An effective hose should probably be no less than 50 feet long.



Choose the planter best suited to your needs.

Planting row guide. A row guide is simply two stakes with a line marked at six-inch intervals stretched between them. It helps you mark straight rows and plant seeds or plants evenly and quickly. A row guide you make yourself works every bit as well as an expensive store-bought one. To make your own, just tie a good string line (as long as your garden at its longest point) between two stakes, and mark the line every six inches with colored markers. Come planting time, set up your guide and piant along it. The straight rows of plants you get when you use a guide are easier to weed, water, and harvest than random plantings.

Plant cages. Although these are commonly referred to as tomato cages, you can also use them to support vining crops like cucumbers and squashes. They're usually made of wire or covered wire and come in a variety of sizes. They contain the plant in a manageable space and keep it off the ground. Round cages are the most common, but you can now buy square ones that are a lot more convenient because they fold flat for storage. When you're buying cages, make sure that they're big enough and sturdy enough for the plant variety and that you can get your hand inside to harvest your crop.

TOOLS FOR CONTAINER GARDENING

If you're a container gardener, special tools—in many respects scaled-down versions of **regular** garden tools—are available for your use.

Hand cultivator. A hand cultivator helps you control weeds. One type has three prongs. The pickax kind has one single-pointed end and a double point on the other end. Choose whatever type you like best.

Hand hoe. This has a shorter handle and a smaller blade than a regular garden hoe.

Trowel. No container gardener should be without a trowel—it's even more useful here than in a full-size garden for filling containers, transplanting, dividing clumps of plants, and leveling soil.

Watering equipment. A watering wand makes it easier to reach the less accessible corners of your container garden. The wand is a hollow metal tube that attaches to the end of your hose, and it lets you water the back rows of your container garden without reaching over and possibly crushing the front rows. If you're an indoor gardener, you will also make good use of a small watering can, and a spray-mister to freshen foliage. Any household spray bottle makes a good mister, provided it is thoroughly washed out first.

Spadework: The Essential Soil

Soil is the thin blanket that exists between sterile rock and the sky. Soil supports all life and is itself, in some measure, the product of living things. For all that, we often treat the soil like, literally, the dirt under our feet. We've developed this careless attitude partly because for generations soil has been dirt cheap. There was never any problem about having enough of it. This is no longer true; good soil is getting harder to find. You can no longer take it for granted that you'll find good garden soil lying around in your backyard. If you live in a residential or industrial area, you can be pretty sure that after the developers left, not much good soil remained. It was probably removed and sold before the construction began, or buried under the excavation for the foundation of the new buildings.

Unless you're a farmer or a commercial grower, chances are you simply lay out your garden in the most convenient spot and make the best of whatever soil happens to be there. But even if what happens to be there is less than ideal, there's a lot you can do to turn it into a healthy, productive garden. Understanding soil and how plants grow in it will help you make the most of what you've got right there in your own yard.

HOW SOIL WORKS WITH YOUR PLANTS

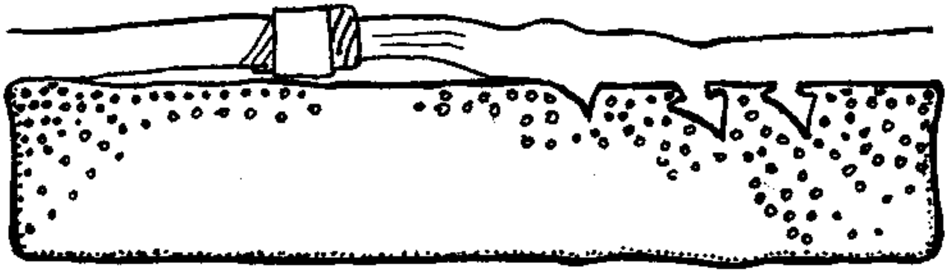
Essentially the function of the soil in relation to the plants that grow in it is fourfold: It must supply water; it must supply nutrients; it must supply gases (carbon dioxide and oxygen); and it must be firm enough to support the plant securely. The ideal soil is a middle-of-the-road mixture, holding moisture and nutrients while letting excess water drain away to make room for air.

Don't make the mistake of assuming that your garden contains only one type of soil; several different soils can exist in one backyard. Each natural soil is composed of fine rock particles, organic matter, and microorganisms. A good soil is 50 percent solids and 50 percent porous space, which provides room for water, air, and plant roots. The solids are 80 to 90 percent inorganic matter and 10 to 20 percent organic materials. Water and air should each occupy about half of the porous space.

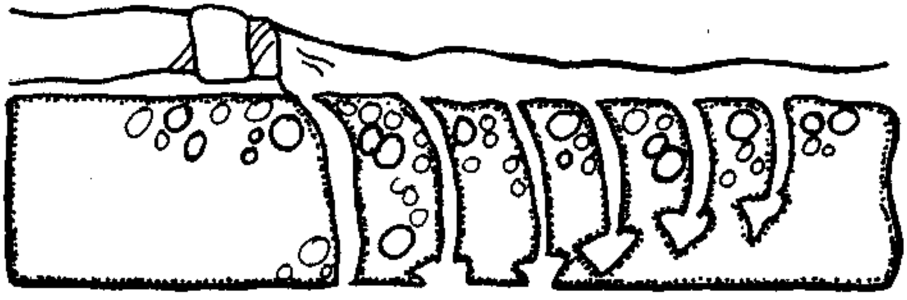
Types of soil

There are four basic types of soil, and the texture of each is determined by the different proportions of various-sized soil particles. These four types of soil are clay, sand, silt, and loam.

Clay soil. A clay soil is composed of particles that are less than 1/31750 of an inch *(1/200* mm) in diameter. These minute particles pack together more closely than larger particles and have a greater total surface area. Clay soil can hold more water than other soils. It often drains poorly, but drainage can be improved by the addition of organic matter to break up the clay particles. If you try to work with a clay soil when it's wet, you'll compress the particles even more closely; then, when the soil dries, you'll be left with a surface something like baked brick or



The small particles of clay soil hold water and often drain poorly.



The larger particles of sandy soil often let water drain through too quickly.

concrete. Properly managed, however, clay soils can be the most productive of all.

Sandy soil. A sandy soil is made up mostly of particles that are over 1/3175 of an inch (1/20 mm) in diameter. They are much larger than clay particles and irregular in shape, so they don't pack as closely together as clay particles. Because they have less total surface area, these larger particles hold less water than smaller particles and are much more porous. Sandy soil drains like a sieve, but can be improved by the addition of organic matter, which helps retain moisture and nutrients.

Silt soil. In a silt soil the size of the particles is intermediate — between clay and sand. Depending on the size of its particles, a silt soil can act either like a clay soil or like a fine sandy soil. Silt consists of small, gritty particles that can pack down very hard, and it's not very fertile. Silt soil is often found on top of heavy clay, which slows or stops drainage.

Loam. Loam is a mixture of clay, silt, and sand particles. A good garden loam is something to cherish, particularly if it also contains a heavy supply of organic matter. All soil improvement is aimed at achieving a good loam — when you add organic matter or make other improvements to your clay or sandy soil, you're trying to provide the type of loam that lucky gardeners have without all that extra work.

A do-it-yourself test of soil mixture

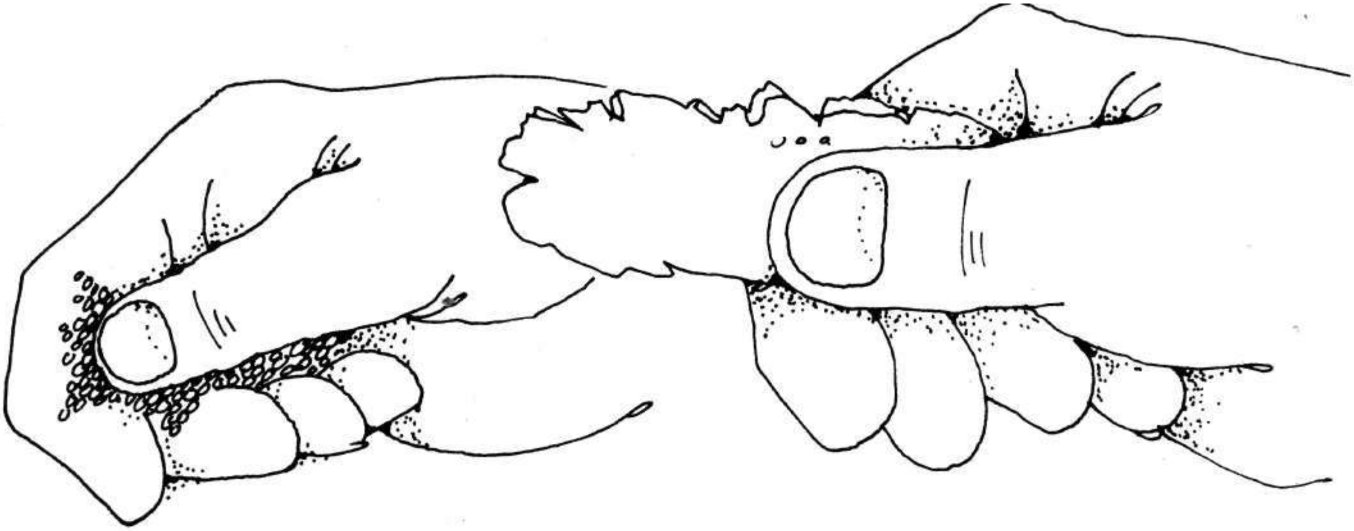
The best way to determine the approximate texture of the soil in your garden is by feeling it with your hands. Try this test: Take a small handful of moist garden soil, and hold some of the sample between your thumb and the first knuckle of your forefinger. Gradually squeeze the soil out with your thumb to form a ribbon. If you can easily form a ribbon that holds together for more than one inch, you have a very heavy clay soil. If a ribbon forms, but it holds together for only three-quarters of an inch to one inch, your soil is a silty clay loam. If the ribbon forms but breaks into pieces shorter than three-quarters of an inch, you have a silty soil. If a ribbon won't form at all, you have a sandy soil.

IMPROVING YOUR GARDEN SOIL

Unless you're one of the lucky people with a garden full of rich, productive loam, it's probable that you will want to improve your soil in the interests of harvesting a bigger and better crop of vegetables at the end of your growing season. When you're planning your soil-improvement program you have to take two issues into account: the texture of the soil and the nutrient content of the soil. You can improve both quite easily.

Improving soil texture

The physical texture of any soil can be improved by the addition of large amounts of organic matter. You can use materials like ground corncobs, sawdust, bark chips, straw, hay, peat moss, and cover crops; it's a great way to recycle a lot of garden wastes. You



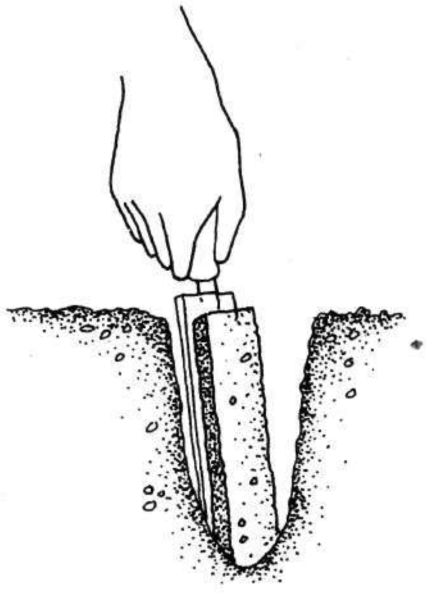
A do-it-yourself test of soil texture—the longer the ribbon that forms when you squeeze the soil between your thumb and the knuckle of your forefinger, the more clay the soil contains.

can use grass clippings, provided the lawn has not been treated with a herbicide or weed killer; these substances will damage the plants you want to grow. Also avoid walnuts or walnut leaves. They contain iodine, which is a growth retardant. Making your own compost pile gives you excellent organic matter to enrich the soil and will be discussed later in this chapter.

The more organic matter you add, the more you can Improve the texture of the soil. Blend the organic matter into the soil to a depth of 12 inches, making sure that it's evenly dispersed through the whole planting area. When organic matter is added to the soil, it will absorb some of the soil's nitrogen; to compensate for this, you should add two handfuls of a complete, well-balanced fertilizer (10-10-10) for each bushel of organic matter, working it thoroughly into the soil.

Improving nutrient content

The next step in your soil-improvement program is to have the soil tested to identify deficiencies — unless you correct those deficiencies, they can cause poor plant growth. In some states the Cooperative Extension Service will act as middleman and send your soil sample to the laboratory for you; in all states the extension service can give you information on firms in your area



Use a trowel to take a soil sample half an inch thick and eight inches down.

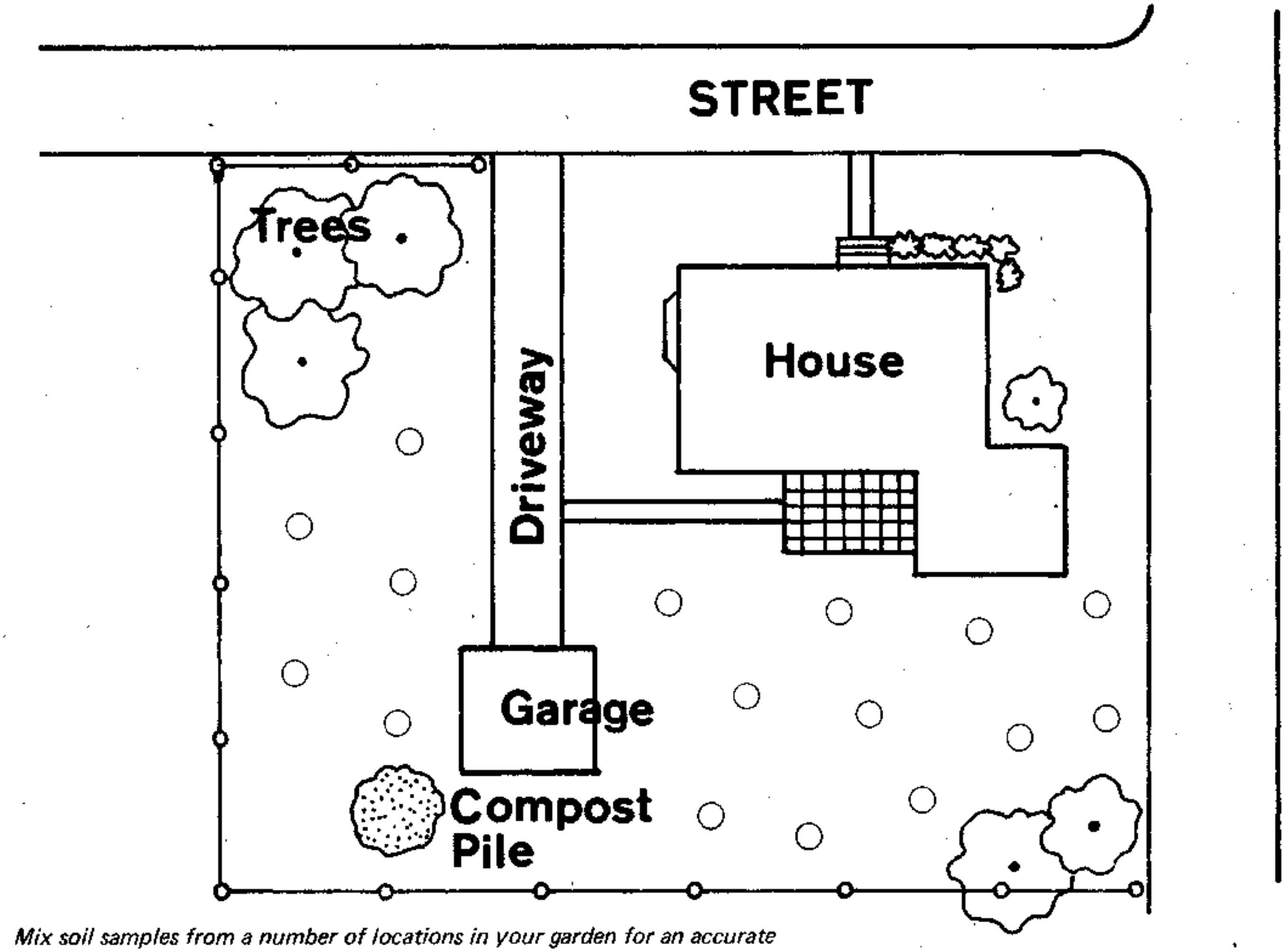
that do the tests. Either way, you will be charged a fee for the test.

The results of the soil test will give you the pH (acid-alkaline balance) of the soil and its content of three essential nutrients: nitrogen (N), which promotes leafy growth (although too much nitrogen will encourage too much foliage growth and slow down crop ripening); phosphorus (P), which is important for root growth and the production of flowers, fruits, and seeds; and potassium (K), which is necessary for the development of leaves and roots. The pH is measured on a scale of 1 (most acid or sour) to 14 (most alkaline or sweet), with 7 representing neutral. Most vegetables do best in soil that has a pH between 5.5 and 7.5, and most of them prefer soil to be on the acid side of neutral.

How to take a soil sample. Soil samples can be taken any time of the year, as long as the ground isn't frozen hard. Use a plastic bucket instead of metal, especially if the soil sample is to be used for testing micronutrients. You'll also need a digging tool, such as a spade or a trowel, and a clean container (a carefully washed-out one-pint milk carton or the container provided by the testing service). All equipment should be perfectly clean.

If there's any grass on the spot you're sampling, remove it. Then take a slice of soil half an inch thick and about eight inches deep straight down from a number of locations throughout your garden. If you're sampling a large area, 20 samples mixed together will do as fine a job as 40 or100. if your garden is small, a minimum of five samples will be enough. Place all the samples in the plastic bucket, and then mix them thoroughly. If the soil is very wet, let it air-dry before mixing. Do *not* heat it in the oven or on a radiator; heat will kill the microorganisms and cause nitrogen and other elements to change form, making the test inaccurate. If there are a lot of lumps, crush them with a wooden spoon or a rolling pin on a wooden surface. After the soil is thoroughly mixed, fill your container and follow the laboratory's instructions for sending the sample.

Adjusting the pH balance. The results of your soil test will give you the pH balance of the soil. If you're lucky, the laboratory may say that the pH is just fine and you need make no adjustment. Or the laboratory may advise you to raise the pH by adding a recommended amount of lime or to lower the pH by adding a recommended amount of a sulfur product — ammonium sulfate is the one most commonly used. Don't use aluminum sulfate in your vegetable garden; the aluminum can be absorbed by the plant, making it toxic to you when you eat the vegetable. You can get lime and sulfur products from hardware stores and garden



Mix soil samples from a number of locations in your garden for an accurate test of the pH balance and nutrient content of your soil.

centers; the laboratory report will tell you how much to use and how to apply it.

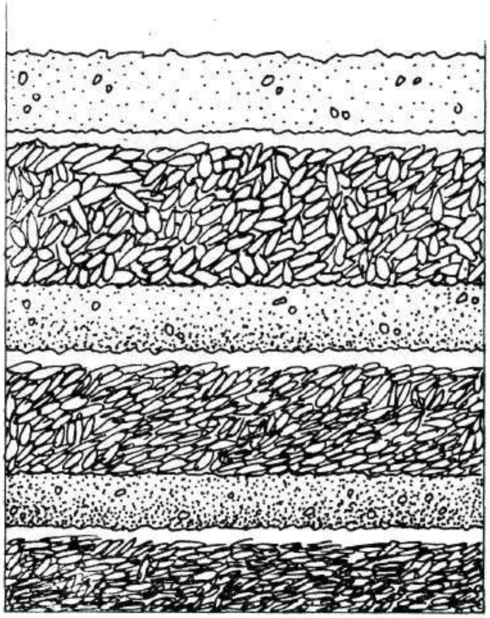
It's a good idea to have your soil tested every three to four years to make sure that the pH is in an acceptable range. If you've had a problem with the pH, it may be a good idea to test your soil even more often. This may seem like a lot of work, but good soil is essential to a good harvest, and your care and labor will pay off in higher yields and better-quality vegetables.

FERTILIZING: HOW TO DO IT (AND WHY)

Many inexperienced gardeners have the idea that since their vegetables have been doing fine so far without fertilizer, they'll do fine without it next year, too. But it's not quite that easy. Certainly, your plants may provide you with vegetables even if you don't fertilize at all, but you won't be getting their best effort. Vegetable plants that are properly fertilized will be healthier and better able to resist disease and attacks from pests, thus giving you more — and higher-quality — produce.

Organic vs. synthetic fertilizers

There are two types of fertilizer: organic and inorganic. They're both means to the same end, but their composition and action differ in a number of ways. Some people make a sharp distinction between the two, and organic gardeners — as the name suggests — are strongly in favor of organic fertilizers and strongly opposed to the use of synthetics. This is more a matter of personal philosophy than of horticulture, because plants can't read the label on the package and can only absorb nutrients in an



Layer organic materials to form a compost pile.

Organic matter has to take nitrogen from the soil in order to keep the decaying process going. Composting keeps the waste in one place where it's not depriving plants of nitrogen.

Composting can save money that you would otherwise spend on soil conditioners and fertilizers. It can save time, too, because it gives you a place to dispose of leaves and grass clippings.

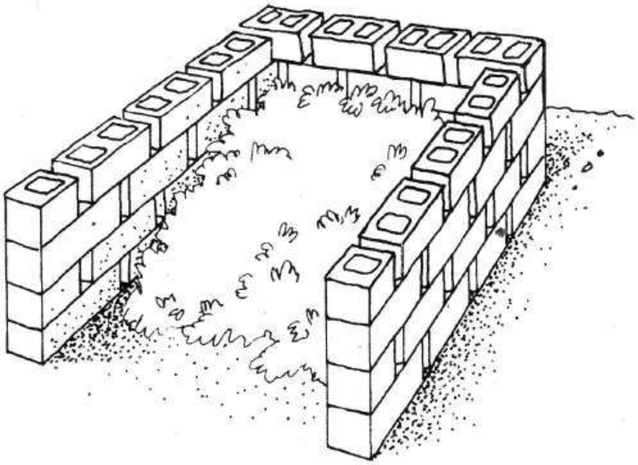
How the composting process works

Compost forms as organic wastes are broken down by microorganisms in the soil. These microorganisms don't create nutrients; they just break down complex materials into simple ones that the plant can use. Most soil organisms are inactive when soil temperatures are below 40°F; they don't begin working in earnest until the temperature goes up to about 60°F, and most of them don't work well in a very acid element. Because they are extremely small, microorganisms work faster when not overwhelmed by large chunks of material.

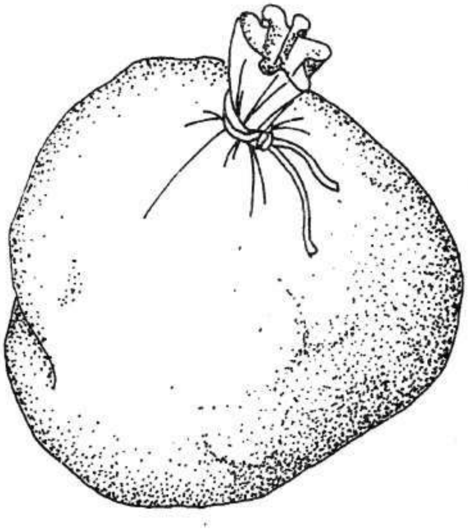
There are two basic kinds of microorganisms: those that need air to work (aerobic) and those that don't (anaerobic). It's possible to compost in an airtight container, thanks to the microorganisms that don't need air. A tightly covered plastic trash can will convert an enormous amount of organic kitchen waste into compost in the course of a winter. The classic outdoor compost pile should be turned regularly with a pitchfork to provide air for the microorganisms that need it.

How to start a compost pile

If you have a fairly large garden, the best place to put your compost pile is at one end of the garden. The



A low wall of cinder blocks keeps the compost pile neat.



Small-space gardeners can compost in a plastic garbage bag.

pile can be square, rectangular or round; four to five feet across; and as long as the available space. You can use fencing or cinder blocks to keep the pile under control •

If space is at a premium or if a compost pile doesn't fit in with your landscaping, start the heap behind some bushes or behind the garage. If the space available is extremely small, you can compost in a large heavy-duty plastic bag or plastic garbage can. You can also work the material directly into the soil.

To build a compost pile, start out with one to two feet of leaves, if you have them, or six to twelve inches of more compact material, such as grass clippings or sawdust. Over this put a layer of fertilizer (manure, blood, bone, cottonseed meal, or commercial fertilizer) and some finely ground limestone (most microorganisms like their environment sweet). Then add some soil to hold water and provide a starter colony of microorganisms. Water the compost carefully. Add a second layer of leaves or other garden waste and repeat the layers. If you have enough material or enough room, put on a third layer. The pile should be kept moist like a squeezed, but not sopping, sponge. As more material becomes available, make new layers, adding more fertilizer and lime each time. Turn the pile with a pitchfork about once a month.

You can use all garden waste on your compost pile except disease- and pest-laden materials, or those that have been treated with pesticides or weed-killers—for instance, grass clippings from an area that's been treated with a herbicide. Use nontreated grass clippings, leaves, weeds, and sod. You can also use kitchen leftovers like vegetable and fruit peels, vegetable tops, coffee grounds, tea leaves, and eggshells. The finer these materials are chopped and the deeper they're buried, the quicker they'll be converted and the less chance there is that they'll be dug up by inquisitive animals. You can also compost hay, straw, hulls, nutshells, and tree trimmings (not walnut). But unless they're shedded, these materials will take a long time to decompose.

There are a number of ways you can speed up the composting process. First, you can grind or shred all. compost materials to give the microorganisms a head start. Second, make sure the pile doesn't dry out, and provide enough fertilizer to encourage rapid growth of the bacteria. Third, you can use a starter culture, either material from an established compost pile or a commercial starter culture.

Composting is a creative activity. There are almost as many different methods of composting as there are gardeners, and like a good stew, the proof is in the final product. And when other gardeners see your compost pile, they'll know you're taking good care of your garden and that you're not just a horticultural dabbler.

Compost and mulch — The difference is in the use

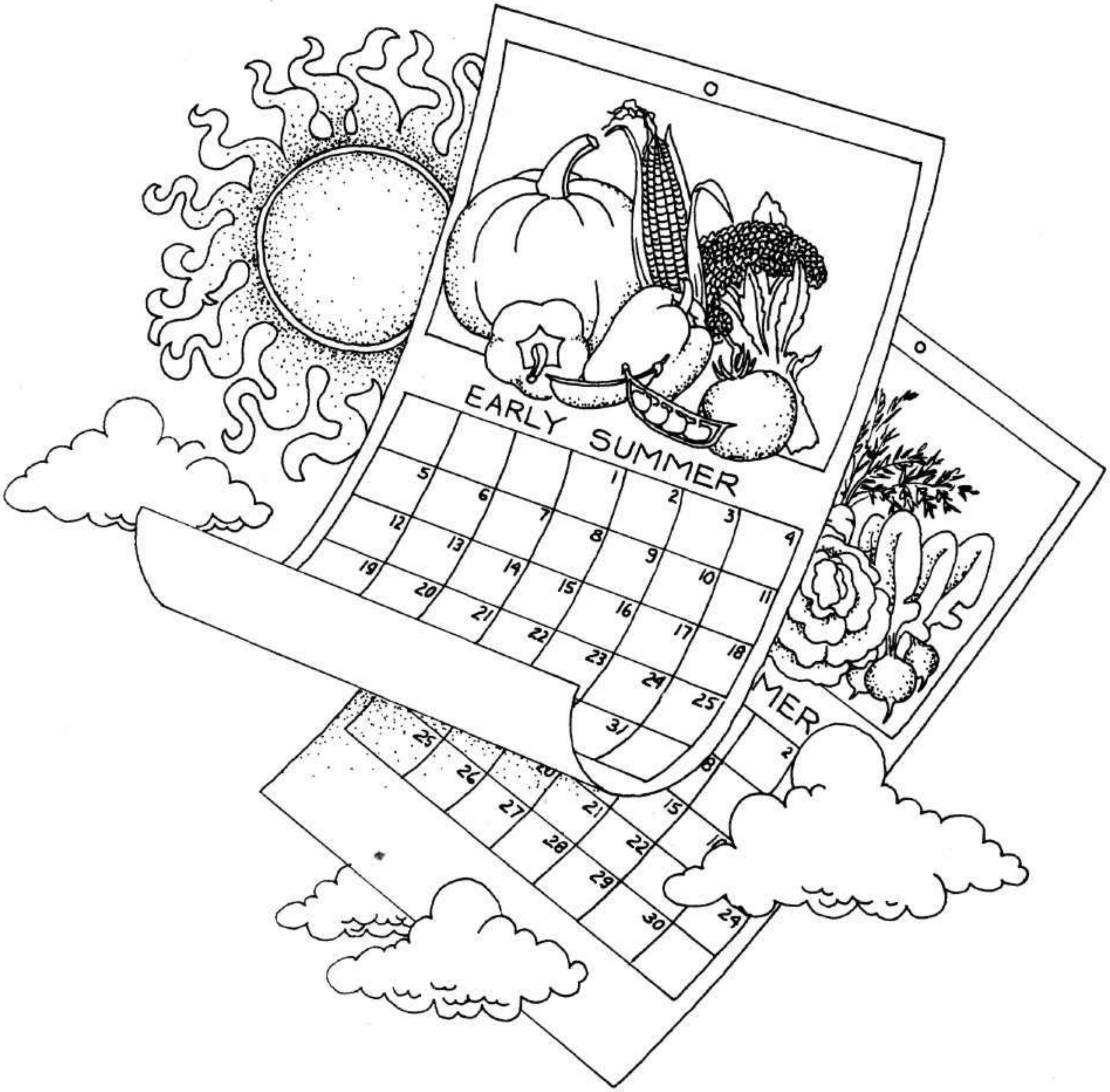
If you're an inexperienced gardener, you may be confused by the difference between composting and mulching — both processes use waste organic matter. The difference is in the use. Composted materials are dug back into the soil to enrich it and to enable the plants to use the nutrients that have been released by the decaying process. A mulch is a layer of material spread over the ground or around plants to provide protection from heat or cold, to retain soil moisture, or to maintain a certain soil temperature. Compost stays in the soil and eventually becomes part of it; a mulch is removed when the protection it provides is no longer needed.

HOW TO GARDEN WITH HOPELESS (OR NO) SOIL

You may be unlucky enough to have a garden full of hopeless soil—heavy clay, perhaps, or as sandy as a beach. Even if you're sure that no soil improvement program would help, you needn't give up hope of having a vegetable garden. It's not too difficult to

Any plant that will grow outdoors in your area will also grow in a raised bed or container garden.

Planting Your Garden

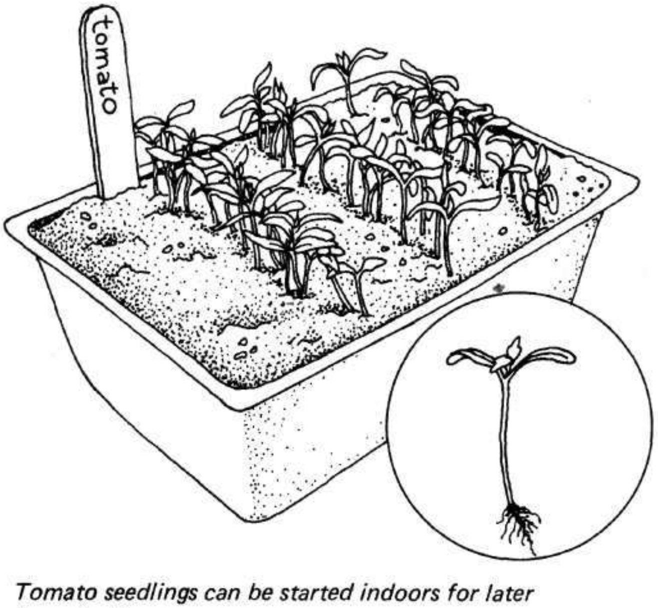


You've probably been looking forward to planting your garden all winter. And you've probably been thinking it's the easiest part, too. What can be so complicated about planting a garden? Nothing to It. Mot so fast—there are a number of questions you have to consider before you start throwing seeds around.

For one thing, should you be planting seeds at all? Or should you be using transplants (young plants started from seed indoors)? If you're going to use transplants, should you grow them yourself or buy them from a nursery or garden store? And how should your crop be spaced—in rows, wide bands, or inverted hills? Like every other stage of growing a vegetable garden, planting poses a lot of questions; It's more complex than you may have figured.

SEEDS OR TRANSPLANTS: HOW TO DECIDE

The answers to the questions of what and where to plant depend on several factors: where you live, the kind of vegetables you decide to grow, and the amount of work you can reasonably handle. It's important to recognize your own limitations in terms of time, energy, and space. If you spend plenty of time at home, you may thoroughly enjoy nurturing your own transplants from seed. On the other hand, your home may not easily accommodate trays of young seedlings that need to be protected from cats, dogs, and curious children. And, if you're away a lot or know you're only going to be able to garden on weekends, you may want to give yourself a break and buy your transplants when you're ready to put them in the ground. Giving due consideration to practical matters like these will ensure that gardening is a labor of love — not a sentence to hard **labor.**



Tomato seedlings can be started indoors for later transplanting.

Growing transplants: Pros and cons

Starting at square one and growing transplants from seeds can be a challenging and satisfying activity. It saves money, and it gives you a chance to experiment with varieties you can't buy locally as transplants. That's the good news. The bad news is that growing transplants yourself requires time, space, and attention. If you only want a few plants or you're just embarking on the gardening experience, you may do better to have someone do the preliminary work for you. Also, these little plants are going to be the foundation of your vegetable garden, so if you can't give them the environmental conditions they need for best early growth, it makes sense to let them start off with someone who can.

Transplants can be temperamental

The whole point of growing vegetables from transplants is to make the best use of your growing season. If a crop needs a long, cool growing season and you know that where you live the weather's going to be hot as Hades long before you can expect to harvest, you're going to have to use transplants. You have to consider, however, the flexibility of the plant variety. Some plants survive transplanting without any problem. Some hate it. Among plants that make the adjustment without much difficulty are broccoli, Brussels sprouts, cabbages, cauliflower, chard, lettuce, and tomatoes. Celery, eggplant, onions, and peppers are a little less tolerant and require some care in transplanting. Other vegetables, especially those with large seeds, resent transplanting and do much better when they're planted directly from seed after the soil warms up. Among these more temperamental crops are beans, corn, cucumbers, okra, peas, summer and winter squash, and watermelons. If you start any of these vegetables indoors, you'll have to use individual containers that can be planted along with them in order not to disturb their sensitive root systems.

Your three-stage planting plan

If you're planting a number of different vegetables, you will probably use all three of the systems we've

mentioned. For instance, you may grow your own tomato and lettuce transplants from seed, direct-seed your peas and beans in the garden, and buy your young pepper plants from a garden center. In this case, your first task will probably be to start your transplants indoors, beginning eight weeks or more before your last date of average frost depending on the varieties you're growing. A couple of weeks later you can start direct-seeding — again timing your plantings according to the variety. Last, you can plant the transplants you purchased.

Good soil preparation is essential to all young plants. You'll be doing your soil preparation before direct-seeding, so the two procedures will be discussed together.

HOW TO GROW TRANSPLANTS AT HOME

It's counterproductive to start seeds too early; this holds true whether you're planting indoors or in the garden. Young plants that are started too early will get long and stringy, and they'll do poorly when they're planted outdoors. The average date of last frost for your area is your reference point for when to plant each vegetable in the garden, and the chart at the end of the chapter will give you this date. Set your indoor planting date six to eight weeks ahead of your outdoor planting date. Follow this rule for each vegetable, and with this schedule, your plants will be sturdy enough to face the outside world when it's time to introduce them to it.

Providing the right environment

The purpose of growing transplants from seed is to provide them with the correct environment for the important early growth period. This requires both care and common sense on your part. Cleanliness, temperature, moisture, and light all contribute to the healthy development of your plants. The following are supplies — or conditions — you'll need in order to grow transplants at home.

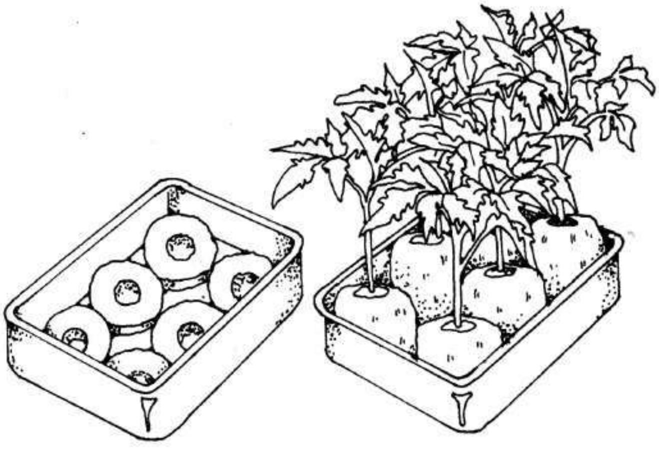
Planting medium. Young seedlings are subject to damping-off — a disease that can ruin your potential crop in infancy. Avoid disease problems by using a sterilized planting medium. Regular potting soil is too rich and will encourage the young plants to grow too quickly. Instead, buy a seed-starter medium from a reputable garden center.

Flats. These are low-sided plastic trays or containers used for planting seeds and are often subdivided into divisions for each half dozen or so plants. They're designed for use by nurseries and professional gardeners, and are usually sold wholesale. Make your own flats out of any shallow container that has sides a couple of inches high; an old cake pan is fine. Whatever container you use, be sure to punch a hole for drainage in the bottom.

Plantable containers. Some varieties of vegetables do not transplant well. They resent having their root systems disturbed and punish you by failing to thrive after transplanting. Among these varieties are corn, okra, beans, cucumbers, squashes, and watermelons. If you start these varieties Indoors you must use containers that can be planted along with the seedling. There are several kinds.

Peat pots are simply compressed peat shaped into a plant pot, and they come in a number of shapes and sizes, so you can match them to the type of seedling you're growing, jiffy pellets are also made of compressed peat, but you buy them as little flat discs a couple of inches across. When you add water they rise to two or three Inches In height. Jiffy 7 pellets have a net wrapping holding the peat in place. This wrapping is supposed to disintegrate within a year after being planted out in the garden; in fact, the wrapping doesn't always disintegrate that fast. Jiffy 9 pellets do not have the wrapping. They disintegrate faster in the soil, but crumble more easily with handling. You can buy trays to hold a dozen or more Jiffy pellets, or you can stand them side by side in a flat.

Labels and markers. It may seem like a bother to mark all your rows or containers, but It's worth it because it saves a lot of confusion. Cabbage family seedlings look much alike when young, as do hot and sweet peppers, or cherry and beefsteak tomatoes. The labels also tell you at a glance when you planted the seeds. This gives you a quick check on how



Expanded peat pellets are planted along with the seedlings to avoid transplant shock.

seedlings out of the seedbed. Lift them from underneath with a knife, spatula, or stick, and hold them by their leaves to avoid permanent damage to the stems. Make a hole in the new planting medium deep enough to accept the roots without crowding, and set the seedling's roots into the hole. Press the soil gently around the roots. Water newly planted seedlings carefully to get rid of air pockets and to ensure that the roots will not dry out; then label them.

Caring for the seedlings

At this state of their development young seedlings have very definite requirements. They need temperatures that are a little on the cool side. For most vegetables a nighttime low of 55°F and a daytime high of 70°F is about right—if it's cooler, disease problems may show up; if it's warmer, the plants will get tall and spindly. It's also important that the seedlings get plenty of light—at least six hours of bright light a day. If your indoor space can't provide enough natural light for your vegetable seedlings, use artificial light as recommended earlier. The best kind are plant growth lights; they emit high levels of blue light, which encourages good stocky vegetative growth. The lights should be close to the leaves of the plants—about six to eight inches is ideal. Keep the lights on for about 12 hours a day; an automatic timer is handy if you're not going to be around.

Preparing your transplants for the garden

Clearly you cannot take these pampered young seedlings straight from their protected indoor setting into the cold, cruel garden. They'd literally die of shock. You have to prepare them for the change in environment, a process known in horticultural terms as hardening-off. You can do this by taking the plants outside during the day and bringing them back in at night for at least two weeks—keep them in, though, if there's likely to be a frost. You can also put them outside in a protected place—a cold frame or a large box—and cover them with a rug or blanket at night. This treatment will ready them for their final place in the vegetable garden.

BUYING TRANSPLANTS FOR YOUR GARDEN

A lot of people find that buying transplants from a reputable nursery or garden center is the easiest way to start their vegetable garden, providing high-quality transplants and few problems. Growing your own transplants from seed is a challenge to your growing skills; it requires a lot of time and planning, and it can be messy. It's more expensive to buy transplants than to grow your own, and you have fewer varieties to choose from. But buying transplants is a lot less work, and if you buy wisely you can get high-quality plants.

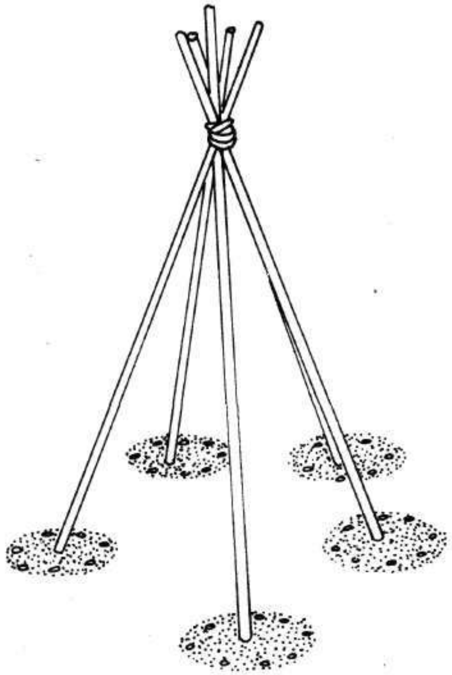
Choose the vegetables you buy as transplants on the same principles that you'd use if you were going to grow your own from seed at home; base your decision on the length of your growing season and the flexibility of the plant variety. Plants that adjust without much difficulty to transplanting are broccoli, Brussels sprouts, cabbage, cauliflower, chard, lettuce, and tomatoes. Celery, eggplant, onions, and peppers are slightly less tolerant and require more careful handling. Plants that do not transplant easily are beans, corn, cucumbers, okra, peas, summer and winter squash, and watermelons. Don't buy these vegetables as transplants unless your growing season is too short to let you grow from seed. If you do buy them as transplants, make sure they're in individual containers that can be planted with them.

Choosing healthy transplants

Always buy your transplants from a reputable source—a good nursery or garden center, or through the mail from an established supplier. The supermarket is not the place to look for vegetable plants. If you buy from an established source you know that the plants have been grown with care, and you know who to go to with questions or problems.

If you're buying from a mail order seed company, the company will usually ship your plants at the right time for planting. If you're buying from a garden center or nursery, buy the transplants just before you plan to set them in the garden, and take time to choose healthy young plants that are free of pests or diseases. Before you go to the nursery or garden center, make a written list of disease-resistant varieties, and stick to it. Check plants carefully before you buy, remembering that they're fragile and not made for manhandling. Check stems and leaves for any signs of pest or disease problems. Just before you buy them, slip a seedling out of its container to make sure that the roots are white and healthy. And , don't forget to find out if they've already been hardened-off.

If you buy your transplants and find you can't put them into your garden right away, leave them outside in a sunny area. If they're tender varieties, bring them inside at night before the temperature drops. Remember, too, that your transplants are in very small containers and will use up the available supply of moisture quickly. Check them often and water them as necessary.



Set supports for pole beans at the time of planting.

Break off the lip of a peat pot before transplanting.

MOVING YOUR TRANSPLANTS OUTDOORS

When you move your own transplants or bought plants into the vegetable garden depends on the variety and your average date of last frost. Refer to the chart at the end of this chapter to find out when you can transplant each type of vegetable. Arrange them on the prepared soil bed so that you can judge the correct spacing. The spacing chart at the end of this chapter gives you detailed information on how much space each variety needs. If the vegetable will need a support later — stakes for tomatoes, for instance, or trellises for beans — set the support at the time of planting. If you wait to stake or set up a support you risk damaging the plant's developing root system.

Dig a hole under each plant as you're ready to set it in the ground, then slip each plant gently out of its container—unless the seedling is in a plantable pot, in which case you plant the whole thing. If you're planting seedlings in peat pots, break off any part of the lip of the pot that might stick up out of the garden soil. If you leave the lip above the soil level it will act like a wick to dry out the soil inside the container, and this could kill the young plant. If the plant is in a clay or plastic container and doesn't pop out easily, slide a knife carefully around the inside of the container. Remember that bruising the stem can cause permanent damage to the young plant. If you have to handle the plant, hold it by the leaves, not the stem. Set each transplant in the soil, and tamp the soil around it firmly with your hands.

Don't plant transplants too deep; set them at the same depth they were in the container. If they are tall and leggy, make a small trench and set the plant at an angle so that some of the stem is also under the soil and the remainder stands straight — the illustration on the next page shows how. This will mean that only as much stem as the plant can support comfortably is left above the ground so that the plant won't get top heavy as it develops.

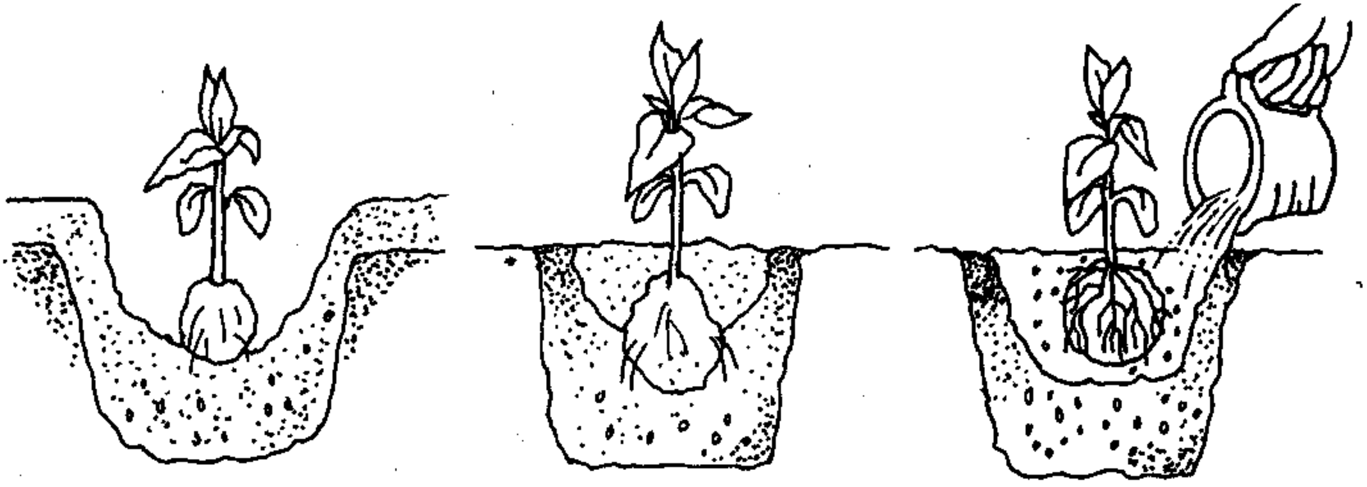
When you've planted each seedling and firmed the soil with your hands, give it a good send-off with an application of a starter fertilizer. Starter fertilizers are high in phosphorus (the middle number on the fertilizer package), which stimulates root growth; if the roots are growing strongly, the rest of the plant will also grow sturdy and healthy. An ideal fertilizer is a 5-52-10 product—52 percent phosphorus in relation to other nutrients. Buy one that matches this formula as closely as possible. Mix the fertilizer with water according to the package directions, and carefully water each transplanted seedling with this solution. Then relax—for the time being, you've done your best for your young plants. Refer to the following section, in which direct-seeding is discussed, for

Long-stemmed tomato seedlings can be planted deeper or on a slant so that they won't grow top heavy.

information on how to protect the plants from unforeseen threats like extreme temperatures, pests, and the like. Whether vegetables are grown from seed or transplants, they require the same care once they're in the garden. Follow the protective procedures indicated to keep your plants healthy until harvesttime.

PLANTING FROM SEEDS IN THE GARDEN

Direct-seeding straight into the garden is the easiest and least expensive way to grow vegetables. But you may not have the sort of climate that will let you direct-seed some vegetables; the seedlings may take longer to grow, making them a lot more



Transplanting your seedlings: Set the seedling in a hole large enough to accept the roots without crowding; fill in and firm the soil; and water with a starter fertilizer solution.

susceptible to weather conditions than transplants grown indoors.

The vegetables to grow from seed are those that will mature within the span of your growing season and those that don't like to be transplanted. If your growing season will accommodate them, all these vegetables do well grown from seed in your garden: beans, beets, carrots, collards, corn, cucumbers, dandelions, kale, kohlrabi, lettuce, mustard, okra, peas, peanuts, pumpkins, rutabagas, soybeans, spinach, squash, turnips, and watermelons.

Preparing the soil for direct-seeding

Soil preparation is the key to successful planting. The first step is to dig up and turn over the soil to a depth of eight to 12 inches—hard work, but a good way to spend a crisp, early spring day. It's important that the soil is neither too wet nor too dry when you dig. Soil that's too wet will compact or form into large clumps that will be so hard when they dry out that nothing short of a sledgehammer will break them. If the soil is too dry, the topsoil will just blow away. Before you get into a good day's digging, pick up a handful of soil and squeeze it; if it forms into a ball that will hold together, yet crumbles easily, the soil is ready to work.

Adding organic matter. Organic matter enriches the soil and improves its ability to control moisture, so add organic matter in the spring to benefit the new season's crop. If you planted a green manure or cover crop in the fall to protect the topsoil, dig it all back into the soil now as organic matter. Do the same if you laid mulch over the soil instead of planting a cover crop; dig the mulch in as you turn the soil. You can also dig in compost that has been simmering nicely all winter.

Fertilizing. You should fertilize your vegetable garden twice a year. As part of your spring soil preparation, dig in a complete, well-balanced fertilizer (10-10-10 or a similar formulation) at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Work the fertilizer^venly into the soil. This application will keep your plants supplied with nutrients until about halfway through the growing season. Then you'll apply the same fertilizer at the same rate, but instead of spreading it over the whole area you'll side-dress by distributing the fertilizer in trenches between the rows of plants.

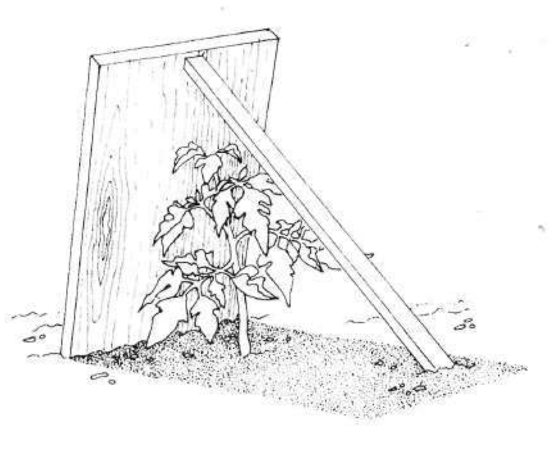
Removing obstacles. When you're preparing the soil, remove all stones, rocks, and lumps, and all the assorted debris that has accumulated over the winter. This is especially important if you're planting root crops, because they'll fork and split if they have to contend with large obstacles; but all seeds do better in well-worked soil. Just before planting, rake the seedbeds smooth and level off the surface by drawing the back of your rake across the soil.

Spacing and sowing the seeds

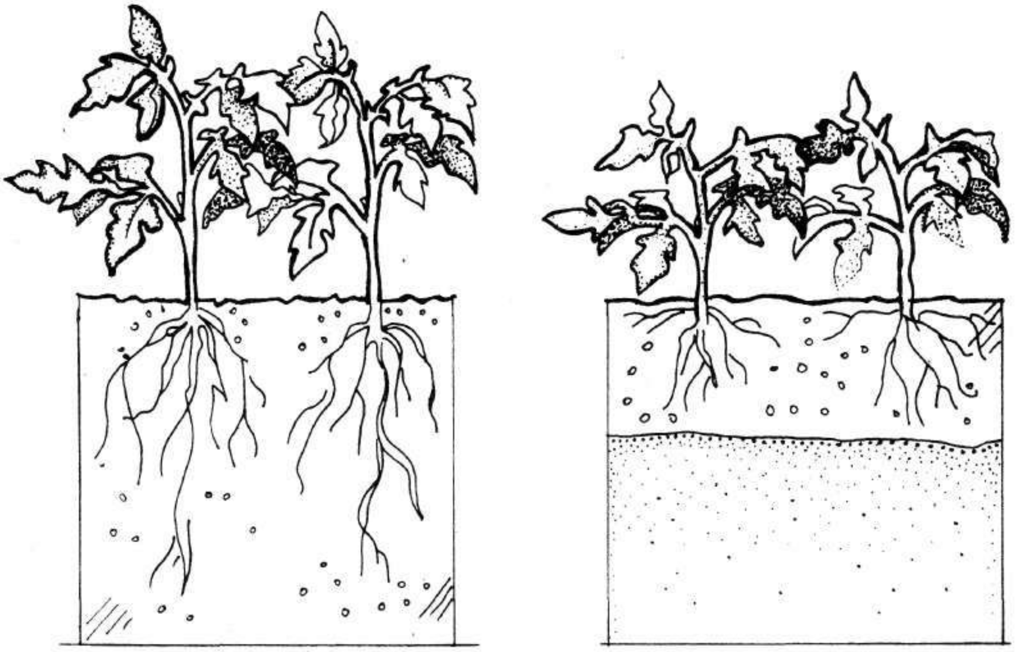
Sowing seeds sounds like a straightforward procedure; but like most of your other gardening activities, there's a procedure to follow to ensure success. One of the easiest mistakes to make is to plant the seeds too deep—or to assume that all seeds are planted at the same depth.

How deep you plant seeds depends on their size; they need only enough soil to cover them and supply moisture for germination, and seeds that are buried too deep may not be able to struggle through the soil surface. The planting guide at the end of this chapter tells you exactly how deep to plant seeds of each vegetable variety. The rule of thumb is that seeds should be covered up to twice their diameter at their largest point. That means if a seed is half an inch in diameter, plant it an inch deep; if the seeds are so small you can hardly see them, just press them into the surface of the soil. After you've set seeds at the correct depth, firm the soil by tamping it with your hands or (gently) with your foot. This prevents the soil from drying out too fast; it also helps keep rain from washing away both the soil and the seeds.

Spacing seeds is critical, because if plants are forced to grow too close together they may produce a poor yield or no yield at all. If the seeds are large enough to handle, like beans and peas, it's fairly easy to space them correctly. With tiny seeds or seeds



Boards can protect young plants from hot sun.



Water generously; deep watering encourages healthy root growth in young plants.

vining crops like cucumbers, melons, squash, and watermelons. Keep an eye out for these pests and hand-pick or wash them off the plants quickly, or spray the plants with carbaryl before they can spread disease. Detailed information on pest control and disease prevention is given in "Keeping Your Garden Healthy."

Don't let your seedlings die of thirst. Adequate watering is essential to young plants in their early stages of growth. Be careful when you water your seedlings, because a forceful blast of water can damage them permanently or even wash them right out of the ground, but be generous. Water to a depth of six to eight inches to encourage deep rooting and stronger growth. If your area is likely to have heavy rains when you're waiting for the seeds to germinate, apply a very light mulch over the seedbed — this will also help to retain the moisture that's in the soil. Don't overdo the mulch or put it on so thickly that the germinating seeds can't push through it.

Give plants room to grow. Thinning is another essential task in the early stages of the seedlings' development. Refer to the planting guide at the end of this chapter for specific instructions on spacing each variety. Thin when the plants are young — when they have formed two true leaves. If you wait too long they may already have suffered from being overcrowded. Thinning is a job that a lot of gardeners do with some reluctance. It seems wasteful to throw out all the extra little seedlings, but if you don't do it you're condemning all your plants to overcrowding and a miserable existence fighting for food, light, and water. You're also defeating your own purpose, because overcrowded plants will give you a poor crop.

STARTING NEW PLANTS FROM PARTS

Seeds and transplants are not the only forms from which to raise new plants; they're the forms you'll use most often, but some vegetables are started from other plant parts — suckers, tubers, slips, crowns, sets, cloves, divisions, or cuttings. In some cases plants can be grown either from seed or from plant parts. Onions, for instance, take a very long time to germinate from seed, so it usually makes more sense to grow them from sets. Other plants grow best from plant parts. The following are ways to start vegetables from plant parts:

Suckers. Suckers, or offshoots, are plants that grow or shoot up from the root system of a mature plant. These suckers are dug up and divided from the mother plant, then transplanted to mature into

new plants. Globe artichokes are usually the only vegetables grown from suckers.

Divisions. Divisions, like suckers, occur naturally in the form of small rooted plants or bulbs that grow from the mother plant, and get their name from the way you separate — or divide — them off to grow as individual plants. You can dig up the new growth as it appears and replant It. Or, as with bulbs, you can dig up the mother plant, separate the small new bulbs, and replant each unit. Horseradish and rhubarb are grown from divisions. You can divide plants in spring or in fall; fall is preferable, because the cool, moist weather gives the new plants better conditions in which to become established.

Cuttings. Cuttings are divisions that don't occur naturally. You obtain them by cutting a piece of stem or side-branch from the plant at a node — a lumpy area on the stem. The cutting is then placed in the soil and forms its own roots. You can also put the cutting in water until roots form.

Slips. Slips are young, tender, rooted cuttings or sprouts grown from roots. Sweet potatoes are the only vegetables commonly grown from slips.

Tubers. These are specialized swollen underground stems, capable of producing roots, stems, and leaves. Irish potatoes and Jerusalem artichokes are usually grown from tubers. When the tubers are cut up for planting, as in the case of Irish potatoes, they are called seed pieces.

Crowns. These are compressed stems near the soil surface that are capable of producing leaves and roots. Crowns are often planted with the roots attached, in which case they're more accurately referred to as roots. Crowns can be divided when the plants are dormant. Asparagus is usually grown from crowns.

Sets. Sets are one-year-old onion seedlings that were pulled when the bulbs were young. The bulbs are then air dried, stored for the winter, and planted the next spring. Onions are the only vegetables grown from sets.

Cloves. These are the segmented parts of a bulb; they're also called bulblets. Garlic is the only vegetable commonly grown from cloves. Each garlic bulb is made up of a dozen or more cloves, and you plant each clove separately. Don't divide the bulb until you're ready to plant; separating the cloves too early may result in lower yields.

WHEN TO PLANT YOUR VEGETABLES IN SPRING

Very hardy vegetables: *Plant 4 to 6 weeks before the average date of last frost.*	Hardy vegetables: *Plant2 to 3 weeks before the average date of last frost.*	Tender vegetables: *Plant on the average date of last frost.*	Very tender vegetables: *Plant 2 to 3 weeks after the average date of last frost.*
Asparagus	Beet	Artichoke, globe	Bean, lima
Broccoli	Cardoon	Bean, broad	Chayote
Brussels sprouts	Carrot	Bean, dry	Chick pea
Cabbage	Celeriac	Bean, mung	Cucumber
Cauliflower	Celery	Bean, snap	Eggplant
Chinese cabbage	Chard	Corn	Muskmelon
Collards	Chicory	Cress	Okra
Horseradish	Dandelion	Mustard	Pea, black-eyed
Kale	Endive	Sorrel	Peanut
Kohlrabi	Jerusalem artichoke	Soybean	Pepper, hot
Leek	Lentil	Tomato	Pepper, sweet
Lettuce	Parsnip	Herbs:	Pumpkin
Onion	Potato, Irish	Basil	Squash, summer
Pea	Radish •	Caraway	Squash, winter
Rhubarb	Salsify	Chervil	Sweet potato
Rhutabaga	Spinach, New Zealand	Coriander	Watermelon
Shallot	Turnip	Dill	
Sorrel	Herbs:	Sage	
Spinach	Anise	Sesame	
Herbs:	Borage		
Chives	Fennel		
Garlic	Marjoram		
Spearmint	Oregano		
Peppermint	Parsley		
Tarragon	Rosemary		
Thyme	Savory		

Planting guide: spacing

Vegetable	Inches between plants	Inches between rows	Depth of seed (inches)
Artichoke, globe	36-48	48-60	
Asparagus	12-18	36-48	1-1½
Beans, broad	8-10	36-48	1-2
Beans, dry	4-6	18-24	1-1½
Beans, lima			
bush	2-3	18-24	1-1½
pole	4-6	30-36	1-1½
Beans, mung	18-20	18-24	½
Beans, snap or green			
bush	2-3	18-24	1-1½
pole	4-6	30-36	1-1½
Beets	2-3	12-18	1
Broccoli	3	24-36	½
Brussels sprouts	24	24-36	½
Cabbage	18-24	24-36	½
Cardoon	18-24	36-48	½
Carrot	2-4	12-24	¼
Cauliflower	18-24	24-36	½
Celeriac	6-8	24-30	¼
Celery	8-10	24-30	¼
Chard	9-12	18-24	1
Chayote	24-30	60	
Chick pea	6-8	12-18	½
Chickory	12-18	24-36	1
Chinese cabbage	8-12	18-30	½
Collards	12	18-24	½
Corn	2-4	12-18	1-1½
Cress	1-2	18-24	¼
Cucumber			
*In inverted hills 36 inches apart**	12	18-72	½
Dandelion	6-8	12-18	¼
Eggplant	18-24	24-36	¼
Endive	9-12	18-24	⅛
Fennel	12-14	24-36	¼
Horseradish	24	18-24	¼
Jerusalem artichoke	12-18	24-36	
Kale	8-12	18-24	½
Kohlrabi	5-6	18-24	¼
Leek	6-9	12-18	⅛
Lentils	1-2	18-24	½

Planting guide: spacing (cont.)

Vegetable	Inches between plants	Inches between rows	Depth of seed (inches)
Lettuce	6-12	12-18	⅛
Muskmelon *In inverted hills 36 inches apart**	18-24	60-96	1
Mustard	6-12	12-24	½
Okra	12-18	24-36	½-1
Onion			
sets	2-3	12-18	1-2
seeds	1-2	12-18	¼
Parsnip	2-4	18-24	½
Pea, black-eyed	8-12	12-18	½
Pea, shelling	1-2	18-24	2
Peanut	6-8	12-18	1
Pepper	18-24	24-36	½
Potato, Irish	12-18	24-36	4
Pumpkin *In inverted hills 72 inches apart**	24-48	60-120	1
Radish	1-6	12-18	½
Rhubarb	30-36	36-48	
Rutabaga	6-8	18-24	½
Salsify	2-4	18-24	½
Shallot	6-8	12-18	¼
Sorrel	12-18	18-24	½
Soybean	1½-2	24-30	½-1
Spinach	2-4	12-24	½
Spinach, New Zealand	12	24-36	½
Squash, summer *In inverted hills 48 inches apart**	24-36	18-48	1
Squash, winter *In inverted hills 72 inches apart**	24-48	60-120	1
Sweet potato	12-18	36-48	3-5
Tomato	18-36	24-48	½
Turnip			
greens	2-3	12-24	½
roots	3-4	12-24	½
Watermelon *In inverted hills 72 inches apart*	24-72	60-120	1

Planting guide: spacing (cont.)

Herb	Inches between plants	Inches between rows	Depth of seed (inches)
Anise	6-12	18-24	¼
Basil	4-6	18-24	¼
Borage	12	18-24	½
Caraway	12-18	18-24	¼
Chervil	3-4	18-24	½
Chives	8-10	12	¼
Coriander	12	12-18	¼
Dill	12	24-36	¼
Fennel	12	2-3	¼
Garlic	3-6	24-36	2-3 (sets)
Marjoram	6-12	18-24	¼
Mint	2-3	18-24	¼
Oregano	6-12	12-18	¼
Parsley	12-18	18-24	¼
Rosemary	18	18-24	¼
Sage	12	18-24	¼
Savory	6-18	12-18	¼
Sesame	6	12-18	¼
Tarragon	18-24	24-36	¼
Thyme	12	16-24	¼

Caring for Your Garden

Planting your garden gives you a great sense of achievement, but this feeling is a bit deceptive—your labors are by no means over. In fact, you're actually only just starting. When you decide to grow a garden, you have to be willing to take on the daily chores that go with caring for it—watering, weeding, mulching, and protecting your crop against pests and disease. You could just sit back and let nature do the work. But if you don't do your part, the result will be lower yields or lower-quality produce.

WEEDING: KEEPING OUT INTRUDERS

Cultivating, or weeding, is probably going to be your most demanding task as your garden's caretaker. Weeds are pushy plants, and they're both resilient and persistent. You'll probably feel at times that if your vegetables grew as well and as fast as your weeds do, gardening would be child's play. It's important to keep down the weeds in your vegetable garden; they steal light, water, and food from the vegetables, and they shelter insects and diseases. The cabbage aphid, for example, will make do with mustard weed while it's waiting to feast on your cabbage or kale. And a green lawn in its proper place soothes the soul and feeds the vanity of the gardener; but in the wrong place the grass roots can choke out young vegetable plants.

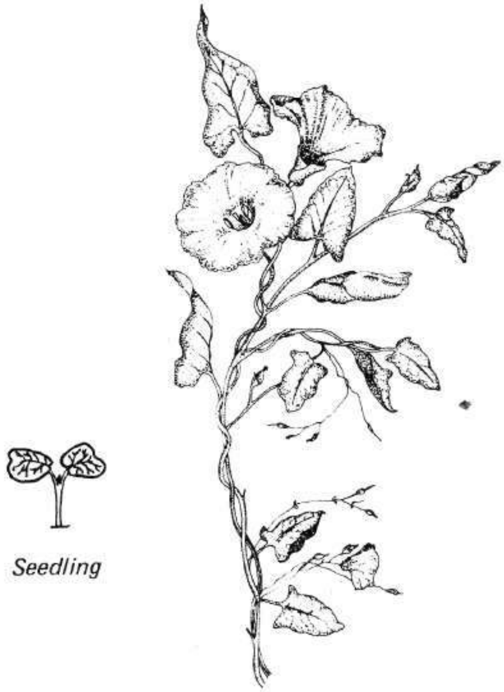
Recognizing garden weeds

To control the weeds in your garden successfully, you have to be able to recognize them when they are young. When weeds are small, regular cultivation will control them easily. If you let them become established, you're going to have a hard time getting rid of them. The next few pages will guide you through the world of weeds and help you to tell, so to speak, your wheat from your chaff. If the children are going to be helping you in the garden, be sure that they, too, know the difference between the vegetables and the weeds. Children—especially small ones—often have trouble figuring out why one plant is desirable and another isn't (some weeds are very attractive), and their well-intentioned help could be destructive.

Here is a guide to help you recognize some of the weeds you're most likely to find in your vegetable garden:

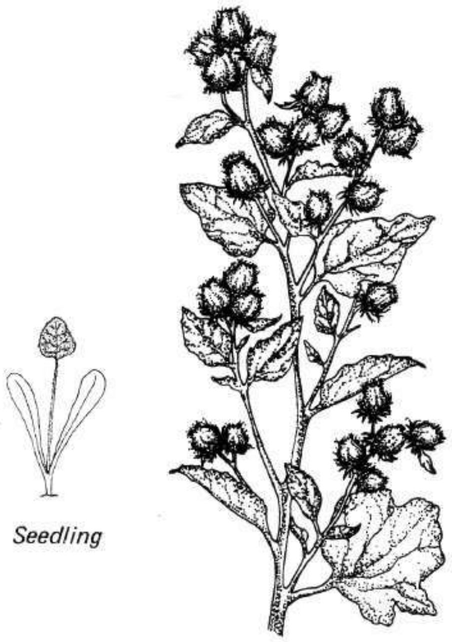
Bindweed (Convolvulus species). The bindweed is a climbing plant with small delicate morning-glory-like flowers. Given its own way, the bindweed will climb up plants and soon choke everything in reach, and it's very difficult to get rid of because every piece of broken root seems capable of propagating a new plant.

Burdock (Arctium species). This plant looks like a coarse rhubarb. Many people have given it garden



Seedling

Bindweed



Seedling

Burdock

room only to find, late in the summer, that their only harvest will be burrs.

Canada thistle (Cirsium arvense). This is a perennial that spreads on horizontal roots. The leaves are usually crinkled, edged v^ith spines or thorns. The flowers are spiny balls topped with purple tufts. Wear a good pair of gloves, and pull out the whole plant; try to remove as much of the root as possible.

Chickweed (Stellaria media). The chickweed is a lacy plant that spreads out over the ground like a doily. It has tiny daisylike flowers, but despite its delicate appearance it should be destroyed when quite young, because it will spread all over the place if you let it go to seed.

Dandelion (Taraxacum officinale). The dandelion is best known to nongardeners for its bright yellow flowers and its seedhead of light, feathery seeds. Gardeners know it for its long, persistent taproot. Recognize the dandelion by its rosette of jagged leaves, and remove it as soon as possible—preferably when the soil is moist. If you try to pull out the root when the soil is dry and hard you'll probably break it, leaving part of the root in the ground to grow right back into another healthy dandelion plant. The dandelion can be grown as a legitimate vegetable, but the weed in your garden won't double for its cultivated cousin.

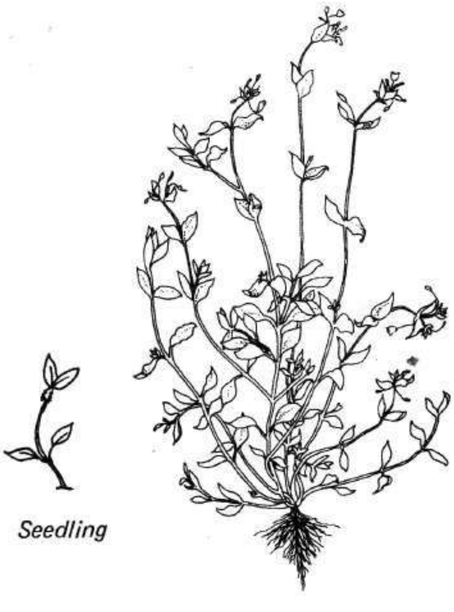
Ground ivy or creeping charlie (Colechoma hederacea). This is a vining plant with small funnel-shaped flowers that have a purplish color. It's very adventurous and crawls along the ground on stems that may extend to a length of five feet. The leaves are almost round and grow in clumps at each node along the square stem. Ground ivy may be one of the most persistent weeds you'll have to deal with in your garden, it will choose the shadiest side of your garden first, but once it becomes established it will spread anywhere. Pull up the entire plant; each node can regenerate a whole new plant.

Lamb's-quarters or goosefoot (Chenopodium album). You can recognize lamb's-quarters by its color—greyish-green with occasional red speckles. It's an upright plant that can grow four feet tall.

Mustard (Brassica nigra). The black mustard grown for its seeds is a good example of a useful plant that escaped from a proper garden and went wild. In some parts of California mustard plants 12 feet tall have taken over whole fields and become real pests.

Pigweed (Amaranthus retroflexus). Pigweed is known as redroot, wild beet, or rough green amaranth. It is a rough plant that can grow to more than six feet in good soil.

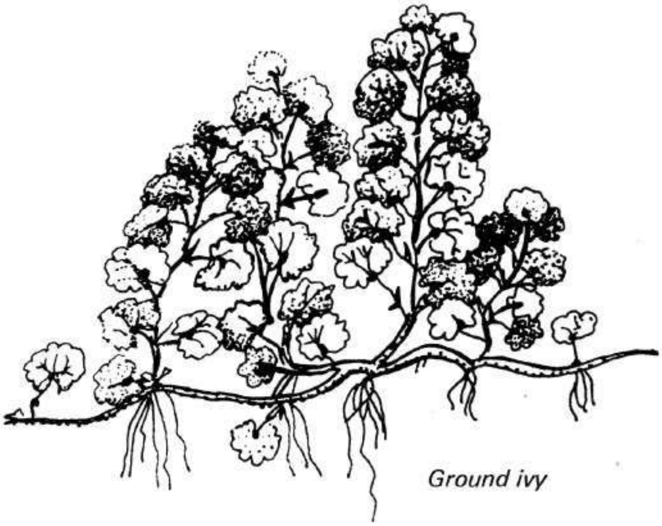
Plantain (Plantago major and Plantago lanceolata). There are two plantains, Ruggle's plantain and buckhorn (also called English plantain or white man's footsteps). Both plants grow in rosettes and are rather similar to the plantain lily (Hosta). They have



Seedling

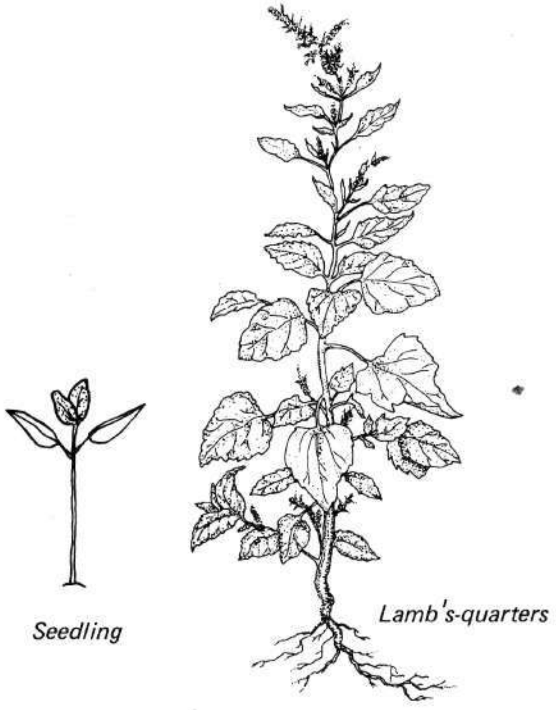
Chickweed

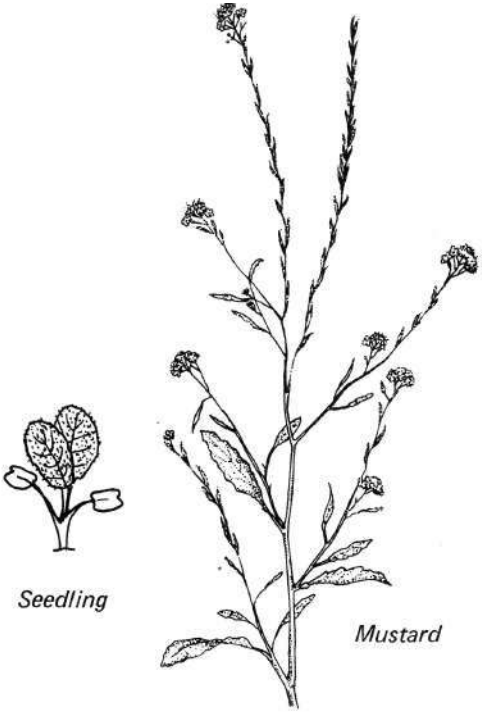
Canada thistle

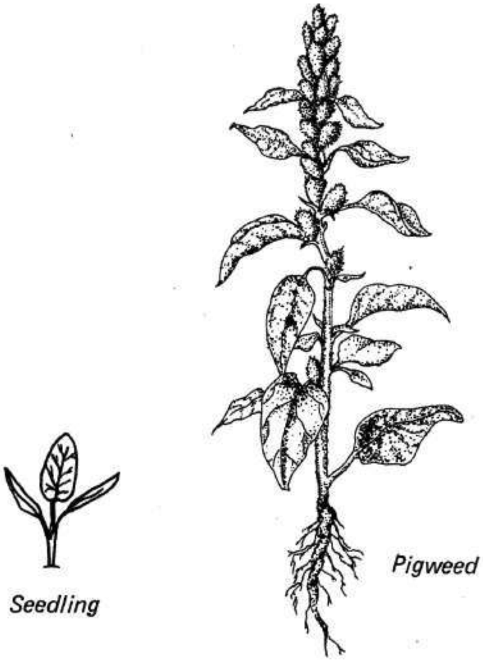


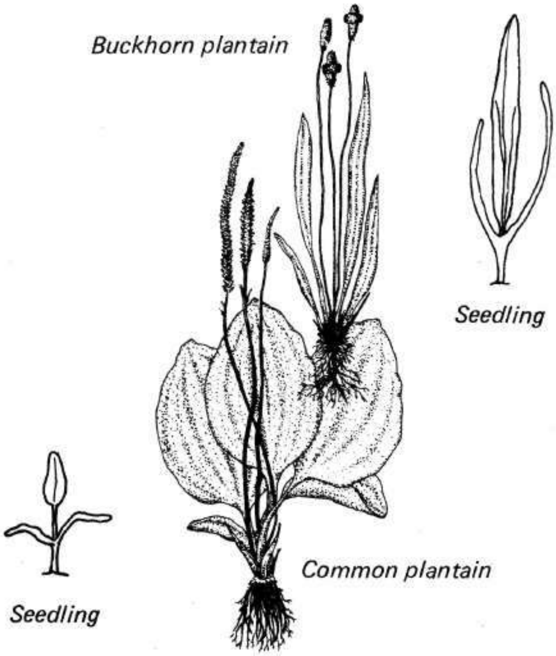
thick clumps of roots that make them hard to pull out, except when the soil is very moist and soft.

Poison ivy (Rhus radicans). The poison ivy plant may be either a small shrub or a vine that can crawl up anything that will support it. The large, shiny leaves (two to four inches long) are grouped in threes and pointed at the tip. Every part of this plant contains a poisonous material that can cause blisters on your





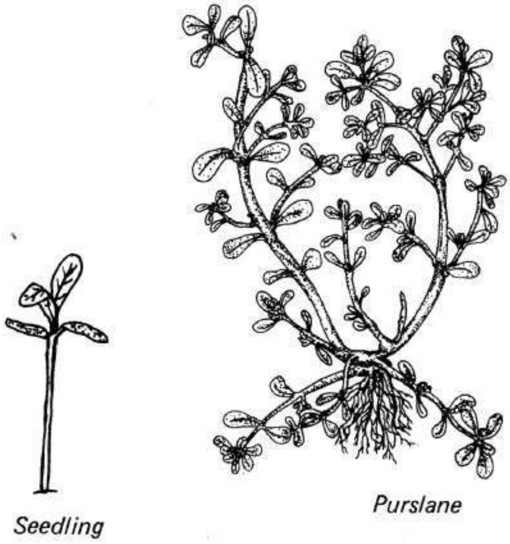


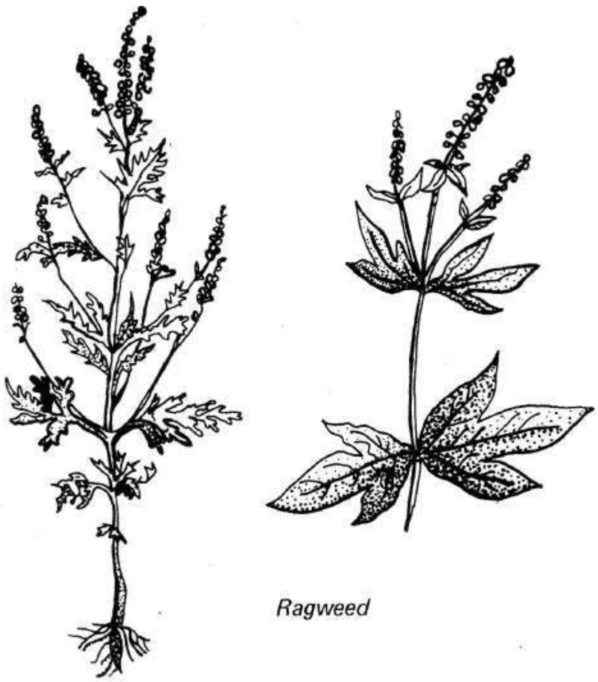


skin. To avoid contact with the skin, control this weed by using a herbicide.

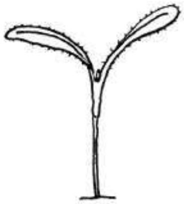
Purslane (Portulaca oleracea). Purslane, which is also called pusley or pigweed, grows flat on the ground. It has thick leaves and thick juicy stems, and it adores rich, freshly worked soil.

Ragweed. There are two types of ragweed: common ragweed (Ambrosia artemisiifolia) and giant*





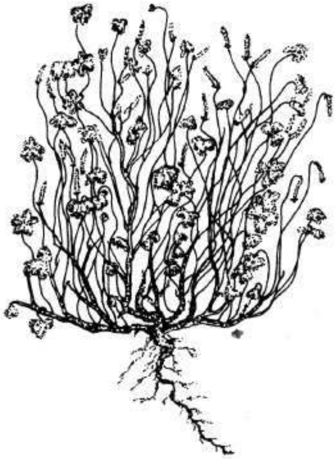
Ragweed



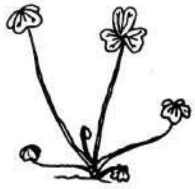
Seedling

Smartweed

ragweed (Ambrosia trifida). Common ragweed is an annual that seeds itself and comes back every year. The leaves are smooth and deeply lobed. It's a much smaller plant than the giant ragweed and will grow only one to four feet tall. Pull up the entire plant before the seeds mature and assure you a return visit next year. Giant ragweed is a perennial, and as its name implies, it gets very large—it will tower to 12



Sour grass



Seedling

Seedling

Violet

to 18 feet in good soil. The leaves are large and slightly hairy, with three or occasionally five lobes. Male flowers are long spikes at the tips of the branches. As with its smaller cousin, pull up the entire plant when it is young before the seeds mature.

Smartweed (Polygonum species). Smartweed is a tough-rooted plant, with smooth stems, swollen joints, and long narrow leaves. Pull up the smartweeds and toss them on the compost pile.

Sour grass (Oxalis stricta). Sour grass is yellow wood sorrel, a delicate plant with shamrocklike three-part leaves and delicate yellow flowers. Its seed capsules are capable of shooting seeds yards away when they ripen. It also has an underground root system that can reproduce without any seeds at all.

Violet (Viola species). It's hard to look on the innocent violet as a weed, but that's what it is. This small flowering plant has deep green heart-shaped leaves and a small, succulent root system that can be easily removed.

Keeping the weeds out of your garden

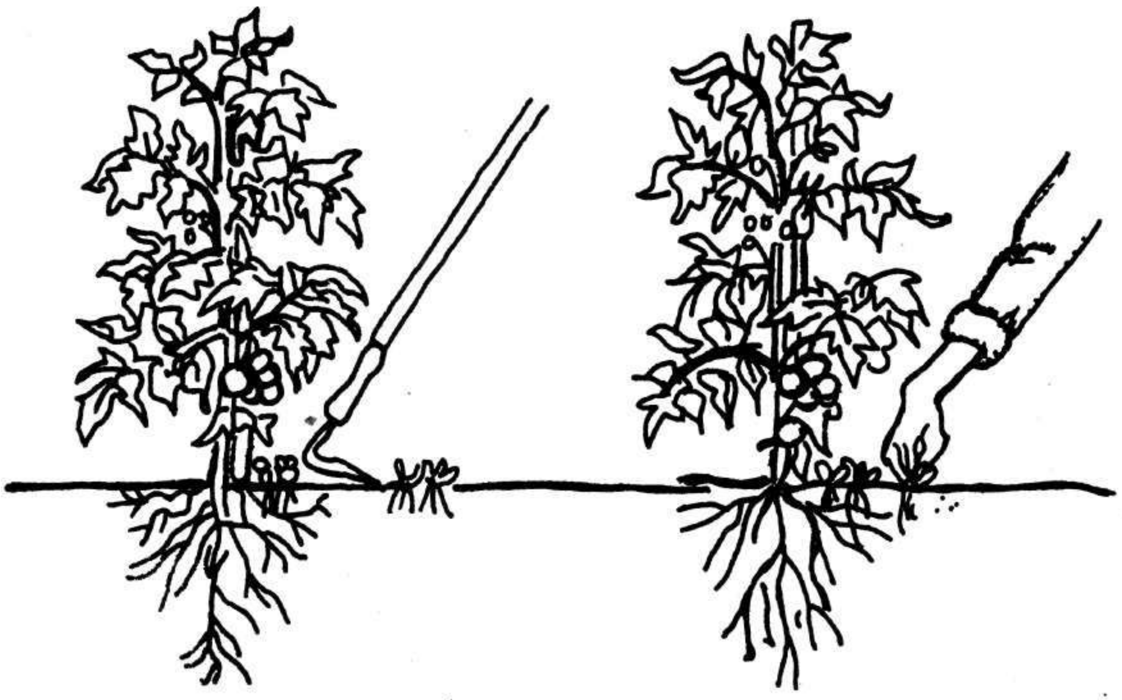
Once you've identified the weeds in your vegetable garden, the best way to control them is to chop them off at soil level with a sharp hoe or knife. If a weed is close to your vegetables, don't try to dig out the whole root system of the weed; in the process you may also damage the root systems of neighboring vegetables. Persistent weeds like dandelions may have to be cut down several times, but eventually the weed will die.

Herbicides, or chemical weed-killers, can be used in some instances. Mulches, which are organic or inorganic materials laid over the soil around your plants, can also control weeds to some extent. There are advantages and disadvantages to both methods.

Herbicides need careful handling

Herbicides can be useful in helping to control weeds under certain conditions, but these conditions are not usually encountered in the small home garden. And herbicides require such careful handling that the home gardener may be well advised not to use them more than absolutely necessary.

Herbicides can be either nonselective or selective. The nonselective types kill any plant with which they come in contact. Selective herbicides may kill only broad-leaved plants or only grass plants. Both types come in forms to kill preemergent germinating seeds without harming plants that are already growing above the ground, or vice versa. Those that act below the soil surface to kill preemergent seeds usually come in granule



When you're cultivating, remove weeds carefully to avoid damaging the roots of the vegetable plants.

form. The granules are shaken on to the ground from the container. Contact herbicides that kill growing plants are usually bought in liquid form and diluted for use in a hand-sprayer or a sprayer that attaches to your hose. Whichever type you use, it's important to follow the manufacturer's instructions to the letter. It's also important to remember that herbicides may have residual effects that vary from product to product. The effect of some may last for weeks; the effect of others may last for years."

You can, if you wish, use a nonselective herbicide in the spring to clear an area for planting. If you do, carefully check that the residual effects will be gone well before your planting date—the information on the label will tell you this. If you misjudge the timing, and the effects of the herbicide persist beyond your planting date, you'll lose your whole crop for the season.

Here are some facts about herbicides you should be aware of:

- Herbicides do not kill all weeds.
- Herbicides can kill vegetables.
- Herbicides that are safe to use in a certain area can drift quite a distance and damage sensitive plants, such as tomatoes and peppers.
- No plant is entirely resistant to herbicides, so if you're using one it's important to follow the instructions exactly as they appear on the label.

If you decide to use a herbicide in your garden, follow these rules:

- If you have a problem that cannot be solved by cultivating and you want to use a herbicide, contact your local Cooperative Extension Service for a reliable recommendation.
- Read all of the label, every bit of fine print, and follow the instructions to the letter.
- Do not use a herbicide unless it is labeled for a specific crop (read the whole label).
- Be sure that the herbicide will not leave a toxic residue on the parts of the plant that you want to eat. •
- Clean spray equipment carefully after each use.
- Mark your herbicide equipment and keep it separate from that used for fertilizers, insecticides, or fungicides. Use herbicide equipment *only for* herbicides.

MULCHES HAVE MANY USES IN YOUR GARDEN

Mulches are either organic or inorganic material placed on the soil around the vegetable plants. Mulches can perform a number of useful functions. They protect against soil erosion by breaking the force of heavy rains; they help prevent soil compaction; they discourage the growth of weeds; they reduce certain disease problems. Organic mulches improve the soil texture. Mulches are also insulators, making it possible to keep the soil warmer during cool weather and cooler during warm weather.

Mulches do not eliminate weeds. They can, however, help control them if the area has been cleared of weeds to begin with. If the mulch is thick enough, the weeds that are already growing won't be able to push through, and the darkness will frustrate the germination of others. Persistent weeds can push their way through most mulch, but if they're cut off at the soil level a few times they'll die. Sometimes mulches can improve the appearance of the vegetable garden by giving it a neater, more finished look. Some mulches give the area a professional look that only a true vegetable gardener can appreciate.

Whether you use an organic or an inorganic mulch, take care not to put it down before the soil has warmed up in the spring—the mulch will prevent the soil from warming and slow down root development. In the average garden in a cool-season climate mulch should be applied about five weeks after the average date of last frost.

Organic mulches improve soil quality

Organic mulches are organic materials that, when laid on the soil, decompose to feed the microorganisms and improve the quality of the soil. If you see that the mulch you've put down is decomposing quickly, add nitrogen to make up for nitrogen used by the bacteria. Some mulches can carry weed seeds; others can harbor undesirable organisms or pests, but both diseases and pests can usually be controlled by keeping the mulch stirred up. When you're cultivating, lift the mulch a little to keep the air circulating.

To use an organic mulch, spread a layer of the material you're using on the surface of the ground around the plants after the soil has warmed up in spring; the plants should be about four inches tall so the mulch doesn't overwhelm them. If you're using a fluffy material with large particles, like bark chips, make the layer about four inches thick. If you're using a denser material like straw or lawn clippings, a two-inch layer will be enough. Be careful not to suffocate the vegetables while you're trying to frustrate the weeds.

The following are organic materials commonly used as mulches:

Buckwheat hulls. These hulls last a long time and have a neutral color, but they're lightweight and can blow away; and sometimes they smell when the weather is hot and wet.

Chunk bark. Redwood and fir barks are available in several sizes. Bark makes good-looking paths and gives the area a neat, finished appearance, but it's too chunky to be the ideal mulch for vegetables. It also tends to float away when watered or rained on.

Compost. Partly decomposed compost makes a great mulch and soil conditioner. It looks a little rough, but other gardeners will know you're giving your garden the very best.

Crushed corncobs. Crushed cobs make an excellent and usually inexpensive mulch. The cobs need additional nitrogen, unless they are partially decomposed. Sometimes corn kernels are mixed in with the crushed corncobs; this will create extra weeding later on.

Lawn clippings. Do not use clippings from a lawn that has been treated with a herbicide or weed killer—these substances can kill the vegetables you're trying to grow. Let untreated clippings dry before putting them around your garden; fresh grass mats down and smells bad while it's decomposing.

Leaves. Leaves are cheap and usually easy to find, but they blow around and are hard to keep in place. They will stay where you want them better if they're ground up or partially decomposed. Nitrogen should be added to a leaf mulch. Do not use walnut leaves; they contain iodine, which is a growth retardant.

Manure. Vintage, partially decomposed manure makes an excellent mulch. Manure has a strong bouquet that you may not appreciate, but don't use a manure that has been treated with odor-reducing chemicals; treated manures contain substances, such as boron, which are unhealthy for plants. Never use fresh, unrotted manure, it can kill your plants.

Mushroom compost (leftover, used). Where it's available, used mushroom compost is generally inexpensive. Its rich color blends in well with the colors of your garden.

Peat moss. Peat moss is expensive when large areas have to be covered. It must be kept moist or it will act like a blotter and pull moisture out of the soil and away from the plants. Once it dries, peat tends to shed water rather than letting it soak in, and the fine grades of peat have a tendency to blow away.

Poultry manure. This is potent stuff—poultry manure is about twice as strong as cow manure; proceed with caution. A good, weathered, four-year-old poultry litter can give you mulch, compost, and high-nitrogen fertilizer, all at the same time.

Sawdust. Sawdust is often available for the asking. but it needs added nitrogen to prevent microorganisms from depleting the soil's nitrogen.

Straw. Straw is very messy and hard to apply in a small area, and it's highly flammable—matches or cigarettes can result in short-order cooking. It does, however, look very professional.

Wood chips or shavings. More chips and shavings are available now that they are no longer being burned as a waste product. They decompose slowly and add needed nitrogen. Beware of maple chips, which may carry verticillium wilt into your garden.

Recycle rugs, papers as inorganic mulch

Unlikely though it may seem to the inexperienced gardener, the following materials can be used effectively as inorganic mulches.

Aluminum foil. Foil is expensive if you're dealing with more than a small area, but it does make an effective mulch. It reflects sunlight, keeps the plants clean, and scares birds away from your garden.

Backless indoor-outdoor carpet. Indoor-outdoor carpeting is ideal for the small garden and makes it easy for the fastidious gardener to keep the place neat. Water goes through it easily, and the weeds are kept down.

Newspapers. Spread a thick layer of newspapers around the plants. Keep them in place with rocks or soil. They will decompose slowly and can be turned under as a soil modifier.

Rag rugs. An old rag rug holds water and keeps the soil moist. It won't look as neat as backless carpeting, but it will be just as effective.

Plastic mulches: pros and cons

Both clear and black polyethylene are used by commercial growers as inorganic mulches. Clear plastic is not recommended for small gardens because it encourages weeds; weeds just love the cozy greenhouse effect it creates. Black plastic is sometimes used in small gardens for plants that are grown in a group or hill, such as cucumbers, squash,orpumpkins. Black plastic should not be used for crops that need a cool growing season—cabbage or cauliflower, for instance—unless it's covered with a thick layer of light-reflecting material, such as sawdust.

There are some advantages to growing with a black plastic mulch. Black plastic reduces the loss of soil moisture, raises the soil temperature, and speeds up crop maturity. Weeds are discouraged, because the black plastic cuts out their light supply, so you won't have to cultivate as much; that means less danger of root damage. The plastic also helps

keep plants cleaner. And when you're making a new garden in an area where there was a lot of grass—if you've dug up a lawn, for instance—black plastic can keep the grass from coming back .

There are some disadvantages to keep in mind as well, and one of them is that you may need to water more frequently. Because of their greater growth under plastic, the plants lose more water through transpiration, especially in well-drained, sandy soils. However, you will need to water less if you use black plastic on soil that holds water or drains poorly. If you're using a black plastic mulch, keep in mind that plants can wilt and rot if the soil moisture is kept at too high a level and there isn't enough air in the soil.

You can buy black plastic from many garden centers or order it by mail from seed and garden equipment catalogs. It should be at least 11/2 mil thick and about three to four feet wide. If you have a piece of wider or thicker black plastic, use it. The wider plastic is harder to handle, and the thicker type is more expensive, but it works well.

Put down black plastic mulch before the plants are set out. Try to pick a calm day; a strong wind will whip the plastic about and make laying it down hard work. Take a hoe and make a three-inch deep trench the length of the row. Lay one edge of the plastic in the trench and cover the edge with soil. Smooth the plastic over the bed and repeat the process on the other side. Be sure the plastic is anchored securely, or the wind will get under it and pull it up.

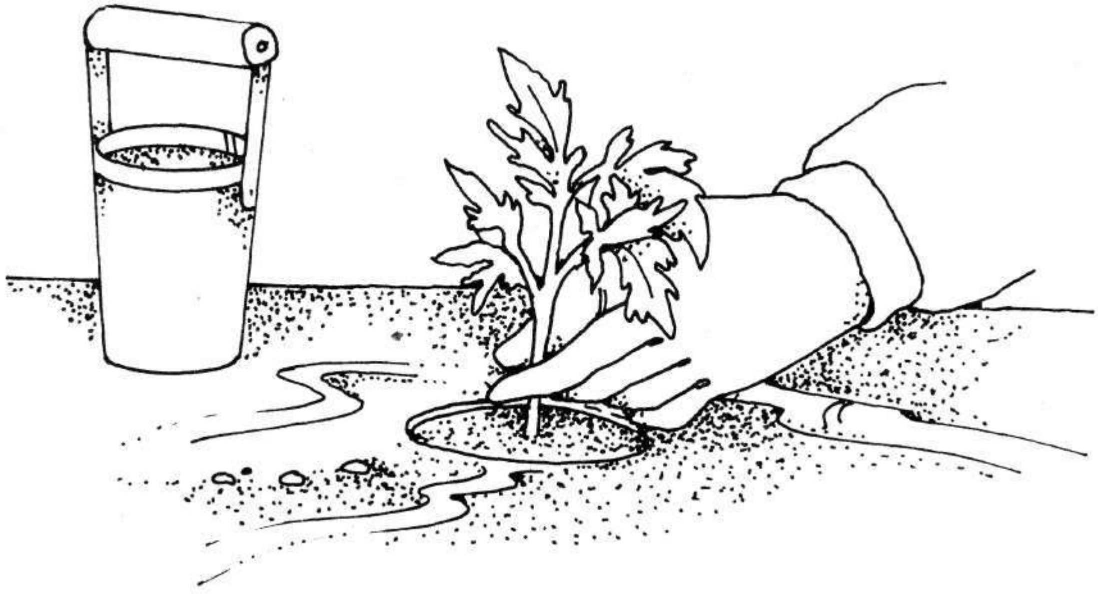
When you're ready to plant, cut holes about three inches across for the plants or seeds. After planting, anchor the edges of the holes with stones or soil. Water the plants through the holes in the mulch. After a rain, check to see if there are any spots where water is standing. If there are, punch holes through the plastic so the water can run through. After the plants are harvested, the plastic can be swept off, rolled up, and stored for use the next year.

WATER: YOUR GARDEN MUST GET ENOUGH

Some plants are composed of up to 95 percent water. Water is vital for sprouting seeds; plants need water for cell division, cell enlargement, and even for holding themselves up. If the cells don't have enough water in them, they collapse like a three-day-old balloon, and the result is a wilted plant. Water is essential, along with light and carbon dioxide, to produce the sugars that provide the plant with energy for growth. It also dissolves fertilizers and carries nutrients to the different parts of the plant.

Where the water comes from

Ideally, water for plants comes from rain or other precipitation and from underground sources. In reality, you'll often have to do extra watering by hand or through an irrigation system. (If you have too much rain about all you can do is pray). How often



Lay down black plastic mulch before you transplant, and cut holes in the plastic for the plants.

you should water depends on how often it rains, how long your soil retains moisture, and how fast water evaporates in your climate. Soil type is an important factor. Clay soils hold water very well—sometimes too well. Sandy soils are like a sieve, letting the water run right through. Both kinds of soil can be improved with the addition of organic matter. Organic matter gives clay soils lightness and air and gives sandy soils something to hold the water.

Other factors may also affect how often you need to water your garden:

- More water evaporates when the temperature is high than when it's low. Plants can rot if they get too much water in cool weather.
- More water evaporates when the relative humidity is low.
- Plants need more water when the days are bright.
- Wind and air movement will increase the loss of water into the atmosphere.
- A smooth unmulched surface will not retain water as well as one that's well cultivated.
- Water needs vary with the type and maturity of the plant. Some vegetable seeds are tolerant of low soil moisture and will sprout in relatively dry soils. These include Brussels sprouts, cabbage, cauliflower, collards, corn, kale, kohlrabi, muskmelon, peppers, radishes, squash (winter and summer), turnips, and watermelon. On the other hand, beets, celery, and lettuce seeds need very moist soil. Herbs generally do better with less water. A large plant that has a lot of leaves and is actively growing uses more water than a young plant or one with small leaves.
- Sometimes water is not what a wilting plant needs. When plants are growing fast, the leaves sometimes get ahead of the roots' ability to provide them with water. If the day is hot and the plants wilt in the afternoon, don't worry about them; the plants will regain their balance overnight. But if the plants are drooping early in the morning, water them right away.
- Mulches cool the roots and cut down on the amount of water needed, increasing the time that plants can go between watering. When the soil dries out, plants slow their growth—or stop growing altogether. Swift, steady growth is important for the best-tasting fruits and vegetables. Mulches keep the soil evenly moist.

There's a right and a wrong way to water

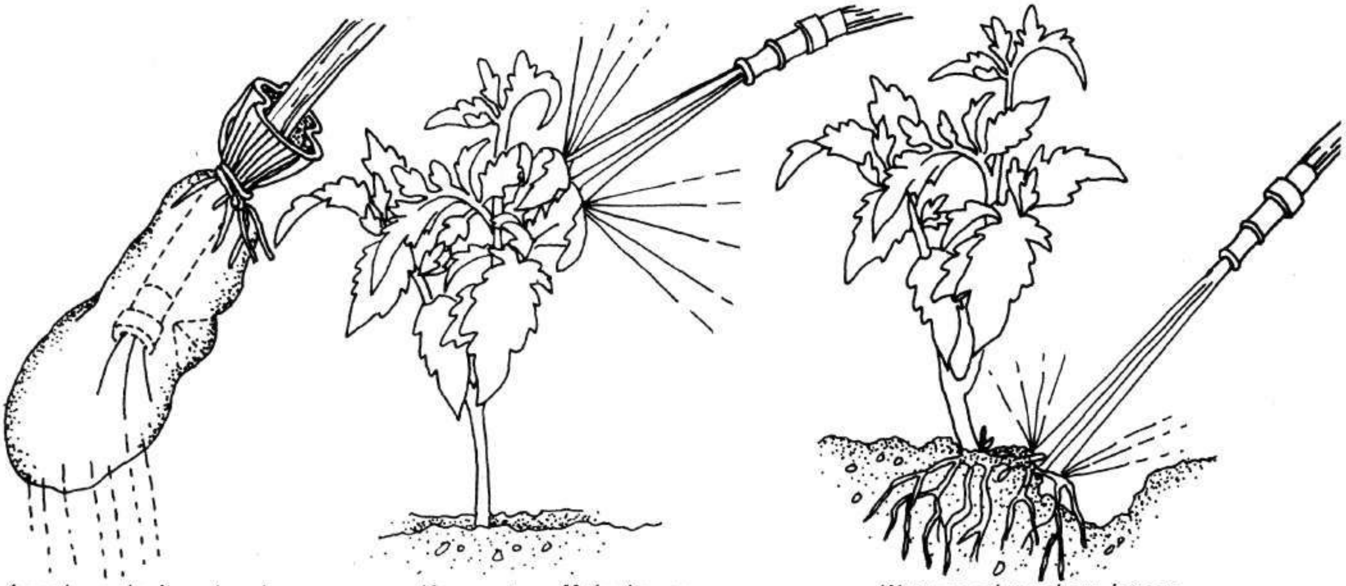
So much depends on climate and the ability of different types of soil to hold moisture that it's difficult to lay down specific directions for watering your garden. Generally, however, vegetable plants need about an inch of water a week. The best time to water your garden is in the morning. If you water at night when the day is cooling off, the water is likely to stay on the foliage, increasing the danger of disease. Some people believe that you can't water in the morning because water spots on leaves will cause leaf-burn when the sun gets hot; this isn't the case.

However hard it is to judge your garden's exact water needs, there are two hard-and-fast rules about watering that you should follow. First, always soak the soil thoroughly. A light sprinkling can often do more harm than no water at all; it stimulates the roots to come to the surface, and then they're killed by exposure to the sun. Second, never water from above. Overhead watering with a sprinkling can or a hose is easy and seems to do a fine job. But in fact, overhead watering wastes water, makes a mess, and sometimes bounces the water away from the plant so the roots do not get any at all. Furthermore, many diseases are encouraged by wet leaves. So direct water at the soil, but water gently so that the soil is not washed away or the roots exposed.

Watering with a can. Carrying water in a can or a bucket can be exhausting and extremely unsatisfying, especially if the water slops over the top into your shoes. Watering cans are easier to carry but harder to fill than buckets. They are good to use for gently moistening the soil after planting seeds and for settling dust. If you unscrew the watering can's sprinkler head and replace it with an old sock, it will be easier to concentrate the water at the base of the plant where it's needed. The sock will break the force of the water so it won't disturb the soil around the roots.

Watering with a hose. A well-placed faucet and hose can save a lot of energy. If you have a large garden, a Y-connector for the faucet makes it possible to attach two hoses at one time. Hose strategy includes having enough hose to reach all points in the garden and arranging the hose in such a way that it does not decapitate plants when you move it around.

If you have a lot of watering to do, five-eighths-inch hose will carry twice as much water as a half-inch hose. Spreading the water about can be speeded up by using basins to catch the water and by digging furrows or trenches between the plants. A length of gutter with capped ends, placed on the higher side of the garden, can be punctured at intervals to coincide with the trenches. Then when water is slowly added to the gutter it flows down all the trenches at the same time. If you want to change the placement of the holes, the ones you don't need can either be



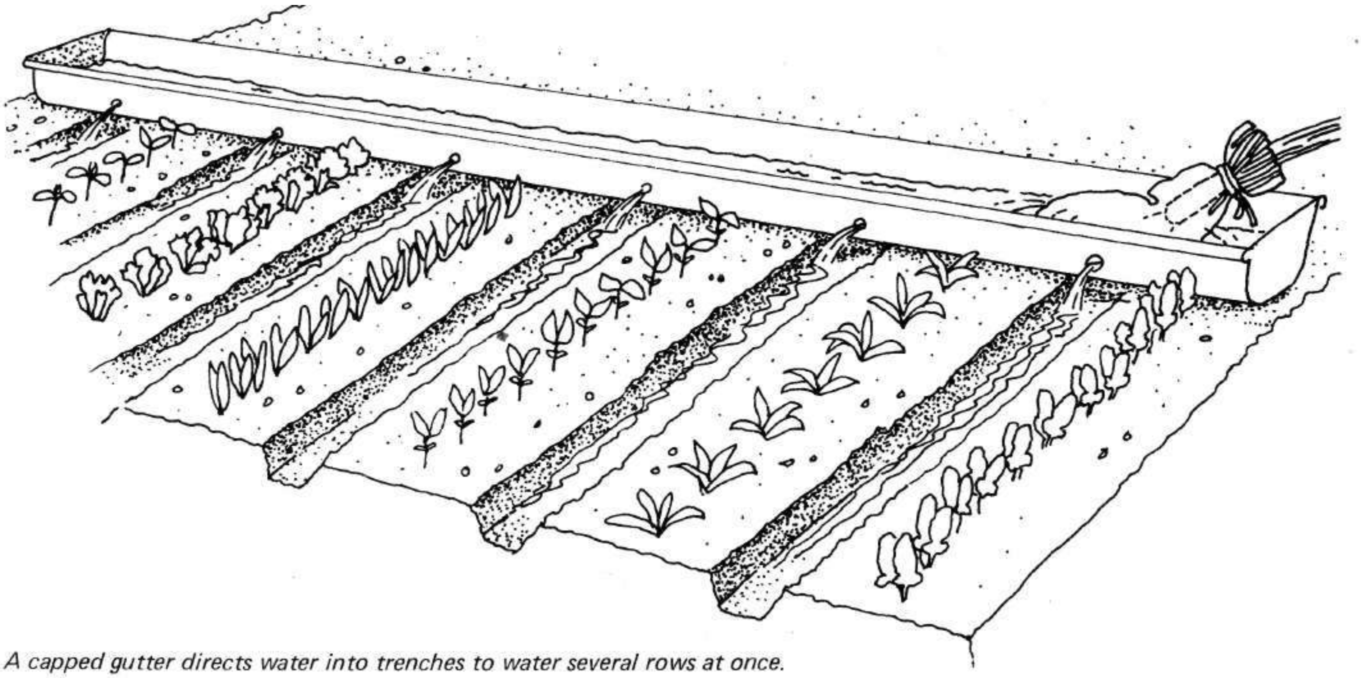
A sock on the hose breaks the force of the water.

Keep water off the leaves of your plants.

Water gently; a sharp jet can wash away the soil.

soldered up or filled with a metal screw.

Watering with a sprinkler. Lawn sprinklers are gentle, but they waste water by covering the whole area indiscriminately and spraying water into the air where it evaporates and blows about. They also wet the leaves, which can spread disease, and often turn the whole area into a mudhole. Canvas soil-soakers are preferable. They carry water gently to the soil around the roots. A wand and water-breaker, which is a length of rigid pipe that attaches to the end of the hose, can make it much easier to put the water where you want it. This is especially useful when you're watering hanging baskets and patio containers. A water timer that measures the flow of water and shuts off automatically when the right amount has been delivered is an expensive luxury.



A capped gutter directs water into trenches to water several rows at once.

But it's an excellent device for the forgetful and can free you to do other things while the garden is being watered.

Gardening is a most satisfying occupation, because you are constantly rewarded for your efforts. All the work you put into your vegetable garden—cultivating, mulching, watering, watching, and waiting—shows dividends in the shape of healthy plants that flourish visibly under your care as the season progresses. And all the labor pays off in tangible form at harvest time.

But even when you've weathered the whole gardening season and brought your harvest home, you still have a few more tasks to complete in order to put your garden to bed for the winter.

PREPARING YOUR GARDEN FOR THE WINTER

The better the clean-up job you do in fall, the easier it will be to start in on the new growing season in spring. You may be tempted to skip some of these last-minute chores, but they're really worth doing because they can make a big difference to the success of next year's garden. True, they could be put off until spring, but come spring you'll have so much to do in the garden that it'll be a big relief to have some of the work out of the way ahead of time.

- It's a good idea to plant what farmers call a green manure or cover crop in the fall as part of your preparation for the following year. This is a crop that you don't intend to harvest. It's there simply to provide protection for the soil underneath, and when you're preparing for your spring planting you dig the whole crop into the soil. A cover crop will keep your precious topsoil from blowing or washing away, and tilling it into the soil in spring will provide valuable organic matter to enrich the texture of the soil. It's not necessary to plant the whole cover crop at one time to cover the entire garden; you can plant in each area of the garden as you harvest. Some of the best green manure or cover crops are rye, clover, oats, soybeans, and vetch. Scatter the seeds over the area you want to plant—if it's a large area a hand spreader will do the job comfortably.
- As an alternative to planting a cover crop, you can prepare the soil ahead of time. Tilling your soil in the fall can save you a lot of time and help you get an earlier start in the spring, because the soil is often too wet in early spring to let you use a spade or a rototiller. If you do till your soil in the fall, make sure to cover the soil with mulch to keep it from blowing or washing away.
- If you're growing perennial crops in a cold climate, fall is the time to protect them against winter temperatures. Apply a mulch over the whole plant when the soil first freezes, but not before then; if you mulch when the soil is still warm, you'll encourage root rot problems. Remember to remove this mulch as soon as the soil starts to thaw out in the spring. The best materials to use for this mulch are organic materials that will let the plants breathe; straw, hay, leaves, and compost are all suitable. Crops you may need to mulch for winter protection include: artichokes (in some areas); chayotes; rhubarb; and such herbs as chives, garlic, marjoram, mints, oregano, rosemary, sage, tarragon, and thyme.

When you're through with these final tasks, you have done the best you can to prepare your garden for winter. It's time to sit back and relax—and if you miss the time in your garden, you can beguile your winter hours by reading seed catalogs and planning the garden you're going to plant come spring.

Keeping Your Garden Healthy

One of the most challenging—and sometimes frustrating — aspects of being a gardener is all the natural forces you have to combat. Even in the unlikely event that you have perfect soil and a marvelous climate, you're still not home and dry; all sorts of pests are In competition with you for your crop. The pest problems you're likely to encounter in your vegetable garden fall Into two categories: insects and the like, of which there are a remarkable variety; and animals, usually the four-legged kind but occasionally two-legged intruders as well.

Most gardeners have to contend with insect problems at some time during the growing season, but the problems are not always obvious. It can come as quite a surprise, just when it looks as though all your hard work is paying off and your plants are progressing healthily towards a fine harvest, to find that the pests are at work. You may notice one morning that a couple of healthy young plants have keeled over and died — a pretty sure indication that you've got cutworms working away beneath the soil level. Or you may see tiny holes in the leaves of your eggplant, signaling the activity of the flea beetle.

Your plants are subject to diseases, too, and you know you're in trouble when the leaves turn'yellow, or the plants seem stunted and weak, or mildew starts to show up on leaves and stems. Plant diseases spread rapidly and must be curbed as soon as they appear, but this isn't always easy. There are certain measures you can take to forestall disease problems — like planting varieties that have been bred to be disease-resistant, and rotating some crops when it's possible to do so. Beyond that, once a disease attacks a plant, about all you can do is remove the infected plant — among horticulturalists this process is called "culling" — to stop the disease from spreading to neighboring healthy plants. On the whole, pest problems are easier to control than problems caused by plant diseases.

CONTROLLING INSECT PESTS

To many people anything In the garden that crawls or flies and is smaller than a chipmunk or a sparrow can be classified as an insect. In fact, a lot of the creatures that may bug your vegetable plants are not insects at all — mites, slugs, snails, nematodes, sowbugs, and symphylans among them. Another popular misconception is that insects and similar creatures are harmful or unnecessary and have no place in the garden. Again, it isn't true. While some insects are destructive, many are perfectly harmless. A lot of them are actually important to the healthy development of your garden crop, some because they perform a specific service by keeping down other pests that do harm your crop, and some because they pollinate the plants. When you set out to control harmful pests, it's important to realize that indiscriminate controls may destroy the good as well as the bad; the useful creatures as well as the harmful ones.

Controlling the insect pests that attack your vegetable garden can be a challenge; the method you choose for controlling them can also be controversial. Many gardeners rely on chemical insecticides to do away with the enemy that's competing for the crop. Some people, however, object to the use of chemicals because they believe that the chemicals may remain on the plant and harm the person who eats it or that they may harm the environment. These gardeners prefer to rely on organic, or nonchemical, means of control. There may also be times when it's better not to use a chemical control even if you have no personal objection to it — if you catch a caterpillar attack in the early stages, for example, it can be easier to pick off the offenders by hand than to mix up a whole batch of insecticide. This chapter discusses the most effective means of control — both chemical and organic — for the pest problems you're most likely to encounter.

CHEMICAL CONTROLS: INSECTICIDES

The surest way to control most of the insects and similar creatures that threaten your vegetable crop is by using a chemical insecticide. A word here about terminology: In horticultural language the terms "pesticide" and "insecticide" are not interchangeable. A pesticide is any form of chemical control used in the garden; an insecticide is a specific type of pesticide used to control a specific situation — to kill insects. A herbicide is a different kind of pesticide with a different application — it's used to help control garden weeds. These distinctions are important, because using the wrong one will cause havoc in your garden. For instance, if you use a herbicide instead of an insecticide you'll lose your entire crop for the season. It's also important to keep separate equipment for use with each kind of pesticide.

Insecticides are chemical products that are sprayed or dusted on the affected crops. The type you spray on is bought in concentrated form, then diluted for use with a hand sprayer or a spray attachment fitted to the end of your garden hose. Dust-on insecticides are powders that you pump on to the plants. Spraying is preferable because it gives more thorough coverage, and it's easier to treat the undersides as well as the tops of leaves and plants

with a spray. You can also apply insecticides directly to the soil to kill insects under the soil surface — this technique is known as applying a "soil drench."

Used correctly and responsibly, insecticides are not harmful to humans or other animals. They are toxic, but the toxicity levels are low, and their residual or carryover effect is short — the longest any of the insecticides commonly used in the home garden will remain on the plant is about 14 days. Malathion, for instance, has the same toxicity level as Scotch whiskey and breaks down faster. As to any long-lasting hazards that may be involved — nobody knows if hazards exist or what they might be; we don't know what the long-lasting hazards of *any* product might be. The choice of an organic or a synthetic pesticide is a matter of personal opinion. If you know all the options you'll be able to make your own choice.

Commonly used insecticides

The insecticides listed below for use in your home vegetable garden will provide effective control of garden insects with minimum hazard. Remember, though, that most insecticides are poisons and must be handled as such.

Diazinon. This is an organic phosphate, and it's an effective insecticide for general use. Diazinon is a contact poison. Its toxicity is low, and it's a good control for underground insects that attack the roots of cabbage family plants, onions, and radishes. You can get it as a wettable powder or in liquid form.

Malathion. This is also a phosphate insecticide; it kills sucking insects like aphids. Its effects are not as long-lasting as those of some other insecticides, but it's effective and safe in use. It's available as a dust, a wettable powder, or a liquid.

Sevin. This is also known as carbaryl and is another safe material for use in home gardens. It's an effective control for many leaf-eating caterpillars and leafhoppers, and is available as a wettable powder or a dust.

Bacillus thuringiensis. This is an organic insecticide. It's a bacterium that is considered harmless to all but insects, and you can buy it under the brand names of **Dipel, Thuricide,** or **Bactur.** It controls cabbage worms and other caterpillars and is available in wettable powder or liquid forms. This is the choice of many gardeners who prefer not to use chemical insecticides.

Cause and cure: Be sure you've got them right

Because an insecticide can't distinguish between friend and foe, it's your responsibility to make sure you're eliminating the pest, not the friendly insect that's out there working for you. Let's say, for instance, that aphids are attacking your cabbage plants, and you use carbaryl (Sevin) to try to get rid of them because you know carbaryl is a relatively safe insecticide with a short residual effect. You've overlooked the fact that carbaryl has to enter the insect's stomach in order to kill it, and since the aphid's mouth is inside the cabbage plant, none of the insecticide is going to enter the insect through the mouth and reach its stomach. Ladybugs, however, love aphids and are most helpful in keeping down their numbers. So when the ladybug eats the aphid, the carbaryl on the aphid's body enters the ladybug's stomach and kills it. Despite the best intentions in the world, you've killed off the useful insect and left the pest unharmed. In fact you've done the pest a favor by killing off its enemy — a ladybug can put away hundreds of aphids in a day.

Carbaryl can also be toxic to bees, and bees are important to your garden because they pollinate most fruiting vegetable crops. To avoid killing the bees, spray in the late evening when the flowers are closed. This way you kill the destructive pests but protect the bees.

If you use an insecticide you must always be aware also of how long its residual effect is going to last. A residue of insecticide left on the plant when it's harvested is poisonous. The residual effect of an insecticide that you use in your vegetable garden is likely to be fairly short, but the effect may vary from one type of crop to another. And because the effect is not long-lasting, you can't spray as a preventive measure; you have no way of knowing which pests are going to attack your plants before they're actually on the scene.

How to use an insecticide

Because research is constantly being done to determine the safety of insecticides and improve their effectiveness, it's difficult to give long-term recommendations about their use. Basic rules, however, always apply: Read the directions and precautions on the label and follow them meticulously, and never make the solution stronger than the label says because you think it'll work better that way. If the product would be more effective in a stronger solution the label would say so.

You need to use common sense when working with an insecticide. If there are just a few, visible insects on your plants, it may be a lot easier to remove them by hand than to go through the full routine of applying a chemical remedy. Also, weather conditions limit when you can use a product

that has to be sprayed or dusted on the plants — you can't do it on a windy day because you can't control the direction of the application. The wind can take your insecticide over into your neighbor's garden; so you'll both fail to correct your own pest problem, and you'll make your neighbor mad. As the one who's using the pesticide, you are responsible for it.

You'll also defeat your own purpose by using an insecticide if rain is expected within 12 to 24 hours. The insecticide must dry on the plant in order to be effective. Whether you use a spray or a dust, make sure that you reach all parts of the plants—you're aiming for a light covering on both the tops and the undersides of all the leaves. Don't give the pests a place to hide; proper coverage is essential if the insecticide is to do its job.

The products we suggest are commonly used in the home vegetable garden as we write this. But before you go out to buy one, check with your local Cooperative Extension Service to make sure that these recommendations are still current.

If you do decide to use a pesticide to control insects in your vegetable garden, here are some important points to remember:

- Read the whole label; observe all the precautions and follow all the directions exactly.
- Check the time period that must elapse between application of the insecticide and harvesting the plant, and observe it strictly. Note all restrictions carefully — often products must be applied at a certain stage in the plant's development.
- Wear rubber gloves while handling insecticide concentrates; don't smoke while you're handling them, and take care not to breathe the spray or dust.
- Sprays usually have to be mixed before each use. Follow the directions, and use *only* the exact proportions indicated on the label. If it's not used exactly as indicated, an insecticide may be harmful to people, animals, or plants.
- Use equipment that you keep specifically for use with insecticides. Don't use equipment that has been used for herbicides.
- Do not apply an insecticide near fish ponds, dug wells, or cisterns; do not leave puddles of pesticides on solid surfaces.
- Use a spray or dust-type insecticide only when the air is still. Wind will carry the product away from your garden and, possibly, be a nuisance to someone else. Don't spray or dust within 12 to 24 hours of an expected rain — the insecticide must dry on the plants to be effective; rain will wash it off.
- After using an insecticide, wash your clothes and all exposed parts of the body thoroughly with soap and water.
- Store unused material (undiluted) in its original container out of the reach of children, irresponsible adults, or animals — preferably in a locked cabinet or storage area.
- Dispose of the empty container carefully. Do not leave it where children or animals can get to it or where it might be recycled for another use.
- Wash all treated vegetables carefully before eating them.

NONCHEMICAL CONTROLS; ORGANIC ALTERNATIVES

It's not always necessary to use a chemical insecticide in your vegetable garden even if you have no particular personal objection to its use. In some cases organic controls can give acceptable results if you don't mind putting in a little more labor for a little less reward at harvesting time. And if you're an organic gardener, there are a few things you should know about helping your vegetables survive attacks by pests.

Planting problem-free vegetables

First of all, you can take the simple precaution of planting only varieties that are not susceptible to major pest problems. There are a lot of vegetables that pests usually don't attack, or don't attack in large enough numbers to cause you any real grief or require the use of nonorganic methods of control. All these are fairly problem-free vegetables: artichokes, asparagus, beets, carrots, celeriac, celery, chard, chicory, cucumbers, dandelion, horseradish, Jerusalem artichokes, leeks, okra, onions, parsnips, peas, radishes, rhubarb, salsify, soybeans, spinach, turnips, and almost all the herbs.

Some vegetables are almost always attacked by caterpillars that can be controlled by Bacillus thuringiensis, an organic product that is harmless to humans and animals. These include all the cabbage family plants — broccoli, Brussels sprouts, cabbage, cauliflower, collards, kale, and kohlrabi. The other insects that commonly attack the cabbage family plants can also usually be controlled by natural and physical methods.

Some vegetables are almost always attacked by large numbers of insects that cannot be controlled by natural or physical methods. This is not to say that you can't grow these crops without using pesticides; you can, but usually your yield will be low. These vegetables include most of the beans, Chinese cabbage, sweet corn, eggplant, lettuce, mustard.

peppers, potatoes, pumpkins, rutabagas, sweet potatoes, tomatoes, and watermelons.

Squash are not included in any of these categories, because although the squash vine borer — their main enerpy—cannot be effectively controlled without using a pesticide, most squash are prolific enough to give you an acceptable crop even If you do lose some to bugs.

Physical controls

Sidestepping pest problems by planting vegetables that are least likely to be seriously threatened by pests is one practical way to protect your crop. Another is the physical, do-it-yourself method of removing the offenders by hand. If you're going to do this, it's essential to identify pests in the early stages of their attack. It's not a big deal to pick a couple of dozen aphids off your broccoli; but when the attack is well under way and your plant is covered with aphids, you might as well forget about hand-picking, because it's not going to work.

If you slip up and let a pest problem get past the early stages, you can try a good blast of water from the garden hose to knock the insects off the plant. Try to do this on a dry day so that the leaves won't stay wet for too long; wet leaves make the plant more susceptible to disease and may give you a new problem to replace the one you've just solved.

Other physical control methods can be effective with specific pests. These methods are discussed in detail later in this chapter.

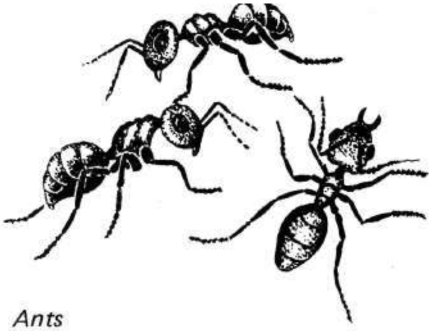
Natural controls

These have to be the original "organic" ways of controlling pest problems in the garden — you're simply relying on harmless insects to destroy the harmful ones. The effectiveness of these natural methods of control is questionable; in some cases you're probably just perpetuating old wives' tales. It's true that insects like ladybugs, lacewing flies, praying mantises, and aphis lions feed on bugs that are destructive to your crop and should, therefore, be protected when you find them in your garden. But it's also true that they can't offer a complete answer to a pest problem. If these helpful creatures visit your garden, welcome and protect them. But don't expect them to control all the pests that bother your plants. That's asking too much of them.

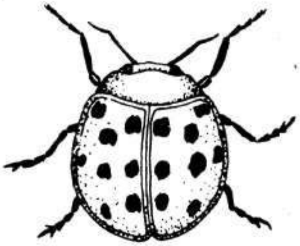
It's possible to buy ladybugs, praying mantises, and the like through the mail from garden supply companies. However, you're likely to be wasting your time and money by doing so. All these insects are winged, and they're all very shy of people. The odds are they'll wing it away as fast as you put them out, deserting your vegetable garden for a more secluded spot. Also, the beneficial Insects that you import may not consider the specific variety of pest that you have in your garden to be a particular delicacy. In this case they'll fly off in search of more appetizing fare. Either way, they're likely to let you down as far as solving your pest problem is concerned.

IDENTIFYING GARDEN PESTS

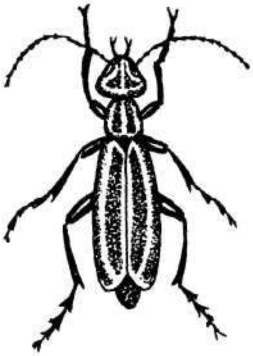
When you're talking about pest control it's an advantage to group the types of pest you may encounter in categories: Some work at night; some work underground; some chew the plant's leaves; others bore into the stems. The following is a list of pests you're most likely to meet in your vegetable garden, and chemical and nonchemical controls for each insect.



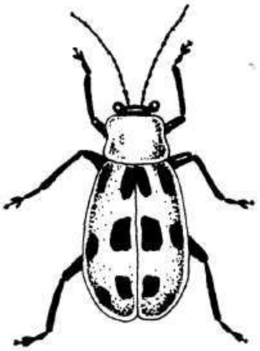
Ants



Mexican bean beetle



Blister beetle



Cucumber beetle

Underground and nocturnal pests

The pest you can't see can be the hardest to deal with. The following creatures work underground or at night, so you don't know they're around until the damage they do is visible.

Cutworms. These are the fat caterpillars of a hairless night-flying moth. They spend the day curled up just under the soil's surface, and they feed at night; in spring they cut off seedlings and transplants at ground level. Later in the season they climb up some vegetable plants and chew large holes in the fruit. Cutworms can be controlled chemically by applying carbaryl to the base of the plants at the first sign of chewing. You can discourage them without using chemicals by putting a collar around each plant when you transplant it. Thin cardboard or a Styrofoam cup with the bottom removed makes an effective collar. The collar should go down at least an inch into the soil and should stand away from the plant 11/2 to three inches on all sides.

Grubs. Grubs are beetles in their immature or larva stage. They live just below the soil surface and feed on plant roots. You may suspect they're active if your plants are growing poorly for no apparent reason, or if you pull a plant and discover the damage. Grubs are normally only a problem where a lawn area has been dug up to make a new garden. Repeated tilling of the soil over a number of years will control the problem. To control grubs in the first year you will need to apply a soil drench of Diazinon.

Root maggots. Maggots are fly larvae. They are yellowish-white, legless, wormlike creatures (a quarter to *VA* inches long) that feast on roots and stems just under the soil's surface. The best nonchemical control is prevention. Discourage the fly from laying eggs near the seedlings by putting shields of plastic three or four inches square around each plant. Take care not to cover the paper with soil when you cultivate. Root maggots attack beans, broccoli, Brussels sprouts, cabbage, carrots, cauliflower, radishes, spinach, squash, and turnips. You can control them chemically by drenching the soil around the plant that's under attack with Diazinon. Don't spray until you see the damage; if your plants are growing poorly, and you can't figure out why, root maggots may be the cause.

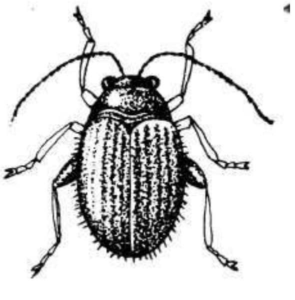
Wireworms. Wireworms are slender, hard worms about an inch long. They eat the seed in the ground and feed on underground roots and stems. After doing their damage, which appears as poor-growing, yellow, wilted plants, they grow up into click beetles. To control wireworms, apply a soil drench of Diazinon when the wireworms are present.

Chewing pests

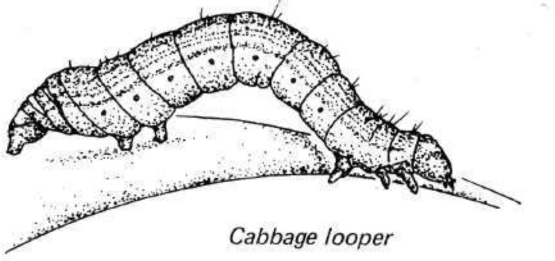
Chewing pests are usually easy to find, especially when they have put in a good clay's work, and they're easier to control by nonchemical methods than the nocturnal and underground pests are. Many of them can be hand-picked off the plant or knocked off with a blast from the hose. Almost every chewing insect that feeds on the outside of the plant can be controlled chemically by using carbaryl. Check to make sure that you have identified the guilty party; apply insecticide when the pest is first discovered, and repeat the treatment as often as necessary according to the directions on the label.

Ants. Except for the leaf-cutting varieties found in the South and West, ants generally do not create much of a problem for the home gardener. If they do nest in your garden, they can be controlled physically by digging up and destroying their nest. They can be controlled chemically by drenching their nests with Diazinon.

Beetles. Beetles come in many sizes and shapes. Some prefer one or two special vegetables; others chew on whatever looks appetizing at the time. Some get their names from their favorite delicacy.



Flea beetle



Cabbage looper

Asparagus beetles feed on asparagus; **Mexican bean beetles** love beans. **Blister beetles** feed on beans, beets,chard, corn, potatoes, tomatoes, and squash. **Cucumber beetles** (spotted and striped) often attack melons, pumpkins, squash, and watermelon, as well as cucumbers. Their eating habits may not cause much damage, but they carry cucumber bacterial wilt, which will kill any of these plants when they're older. **Flea beetles** will eat almost any garden crop. They're very small, and it's difficult to spot them, but you'll know they're there when tiny black dots jump from the plants when you come near, and when you notice that the leaves of your vegetable plants are suddenly full of small holes scattered over the entire leaf surface. **Potato beetles** chew on eggplants, potatoes, and tomatoes. If there are too many small beetles to hand-pick, try to hose them off. All these beetles can be controlled chemically with carbaryl, used according to the label directions.

Borers (squash vine borers). Cucumbers, melons, pumpkins, and squash are attacked by this borer. The egg is laid on the outside of the stem by a night-flying moth. The eggs hatch, and the borers tunnel inside the stem of the plant. As they grow inside the stem, they eat it out, and eventually the plant wilts and dies. Watch for the warning signs: stunting or unexplained wilting of the plant or — this is the surest evidence of who the culprit is — a small hole at the base of the plant and a scattering of sawdustlike material around it. A chemical control of carbaryl needs to be applied at weekly intervals to the crown of the plants before the borers get inside the stem. Once the borer gets inside the plant chemical controls will not help. You can control them physically if you slit the stem, remove all the borers, and cover the spot with earth to encourage root growth at that point. This attempt at a cure may have the opposite effect and kill the plant. But it's your only chance to get rid of the borers.

Cabbage loopers and cabbage worms. These caterpillars love to feed on all members of the cabbage family; occasionally they will make do with lettuce. To control them, spray with Bacillus thuringiensis, an organic insecticide that is available under a number of trade names including Dipel, Thuricide, and Bactur. This is a completely safe organic spray that will destroy the caterpillars without harming humans or animals.

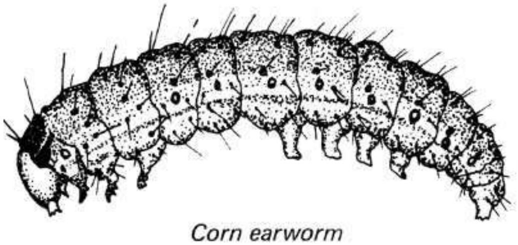
Corn earworms. These caterpillars prefer corn, but they also feed on beans, tomatoes, peppers, and eggplant. They are also called tomato fruitworms. To effectively control them, be prepared to spray on a regular schedule with carbaryl. Hand-picking and cutting out the damaged parts of the vegetables will give limited control of this pest.

Grasshoppers. They have great appetites and will eat anything and everything. They usually appear in late summer and are more active where the winters are warm and the summers are hot. Try to control them when they are young by hand-picking them off the plants or by destroying the untended weedy spots near the garden where they begin life. Control them chemically when they are young by spraying untended weedy areas with carbaryl.

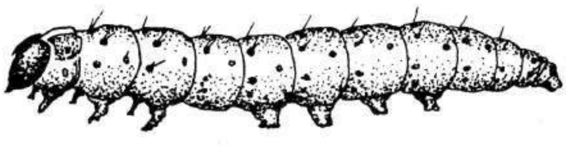
Hornworms. Hornworms are large green caterpillars three to four inches long with a hornlike growth on their rear end. They eat the foliage and fruit of your tomato plants. Since the large hornworms do not usually invade in great numbers, hand-pick them individually off the plants. If your garden is invaded by numerous hornworms spray them with Bacillus thuringiensis.

Parsley caterpillars. These feed on parsley, dill, fennel, and other members of the parsley family. They're not common enough to be a major problem, and hand-picking usually provides satisfactory control.

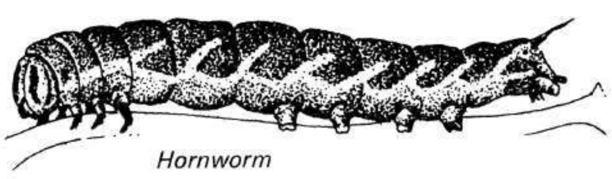
Leaf miners. Leaf miners are the larvae of a fly that feed on the external portions of a leaf. They will feed on cabbage and its relatives, and on chard, beets.



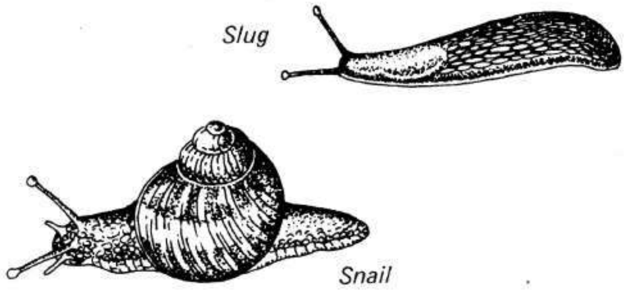
Corn earworm



European corn borer

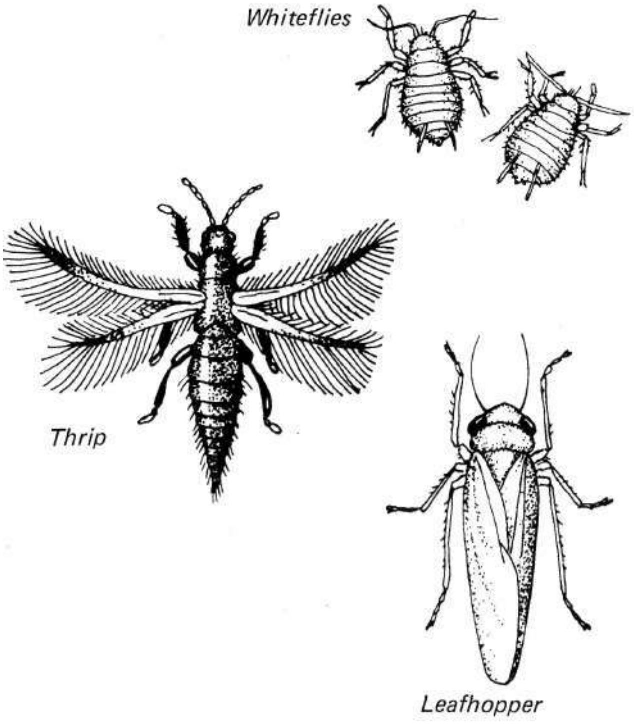


Hornworm



and occasionally lettuce. The best method of controlling the leaf miner is to remove affected leaves from the plant by hand and to hand-pick egg masses that can usually be found on the backside of older leaves. Since the leaf miner is inside the leaf surface, chemical controls are ineffective.

Slugs and snails. Snails have shells and slugs don't. Both are more closely related to oysters and clams than they are to insects. You can detect their presence by the slimy trail they leave from the scene of their activity. They don't like to be out in the heat of the day; they eat and run and can be hard to control. They like to feed on cabbage and all its relatives, and on carrots, lettuce, tomatoes, and turnips. To control them remove their hiding places — old boards, cans, bricks, and other garbage. Lay scratchy sand or cinders around each plant to discourage them. Or set a saucer in the soil with the rim flush with the soil surface, and fill it with stale beer. The slugs and snails will be attracted to the beer and fall in and drown. Then you can dispose of them in the morning.



Sucking pests

Aphids, leafhoppers, mites, and thrips may be hard to see. By the time their damage is apparent it is often too late to take much action. Watch for scraped and rusty-looking places on leaves, twisted and deformed leaves and leaf-tips, and stems that look unusually thick.

Aphids. Aphids are tiny pear-shaped insects, often green, that will attack almost every vegetable crop commonly grown. They feed by sucking the sap of the tender stems and leaves, causing distortions. They also exude a sweet substance called honeydew, which is attractive to ants and can cause sooty molds. Aphids are also carriers of mosaic virus and other diseases. Ladybugs and their larvae eat aphids — provided that they're hungry and the aphids are the kind they like — and may help you control the pests. Aphids can also be controlled nonchemically by pinching out infested tips. Aphids can be chemically controlled by an application of Malathion or Diazinon (make sure to cover the underside of the leaves). Malathion generally has a shorter residue effect.

Leafhoppers. These are green, jumping, winged insects about an eighth inch long when adult. They feed on the undersides of the leaves, sucking sap and causing light-colored spotting on the upper side. They can also spread plant diseases. Populations can be discouraged organically by hosing them off the leaves. You can control leafhoppers chemically by spraying the underside of the leaves with carbaryl or Malathion. They will feed on beans, carrots, chayote, cucumbers, endive, lettuce, melons, and potatoes.

Spider mites. Spider mites are very small and difficult to see. You can be fairly sure that spider mites are to blame if the leaves are losing color in spots and turning yellowish, light green or rusty and there are silvery webs on the undersides. Spider mites are difficult to control even if you use the proper chemicals. You can spray the undersides of the foliage with Diazinon before populations get too large. If you don't want to spray or if the spraying is ineffective, remove the affected plants before the spider mites spread.

Thrips. Thrips are small, fast-moving insects that are almost invisible to the naked eye. The damage they do shows up first as white blotches, then there is a distortion of the leaf tips. When thrips attack onions.

they dwarf and distort the bulbs. Thrips also attack beans, beets, carrots, cabbage and its relatives, celery, cucumbers, melons, onions, peas, squash, tomatoes, and turnips. Large populations of thrips can be discouraged by hosing them off the plants. Thrips can be controlled chemically if you spray them with Malathion or Diazinon.

Whiteflies. Whiteflies are minute sucking insects that look like tiny white moths. They live and feed on the undersides of leaves and live unnoticed until you disturb the plant, then they fly out in great white clouds. Whitefly populations can be discouraged by hosing them off the plants. Control them chemically by spraying the undersides of the leaves with Malathion or Diazinon,

PLANT DISEASES: PREVENTION BETTER THAN CURE

A number of plant diseases are the result of unfavorable growing conditions, but many are caused by parasitic bacteria and fungi that cannot produce their own food and rely on the plant for nourishment. Some diseases are airborne, and others can live for years in the soil, so it's difficult for the gardener to predict or control them.

As a matter of policy, prevention is better than cure — or attempting a cure — where plant diseases are concerned. You can try to avoid the conditions that promote disease by choosing your planting sites wisely. Primarily you want to avoid the combination of too much moisture, too much shade, and soil that's too cool — the three conditions that provide an ideal environment for the propagation of diseases. You can also plant disease-resistant varieties, rotate crops, and take steps to keep your garden clean and healthy.

If your preventive measures don't work, you'll have to cut your losses. There's little you can do to save a plant that has been attacked by a parasitic fungus or bacterial disease, and your best bet is to remove the affected plant as soon as possible before the disease has a chance to spread to healthy plants. This may seem drastic, and you may be tempted to save the plant, especially if it's near harvesttime. Don't give in to temptation —you're risking the rest of your crop. Remove the diseased plant and burn it, put it in the garbage, or dispose of it elsewhere well away from your vegetable garden. Don't leave it lying around the garden, and don't put it on the compost pile.

Protecting your garden from disease

Maintaining a healthy garden requires you to be a conscientious gardener. Here are methods you can use to keep your garden free from disease:

Prepare the soil properly. Make it easy for your plants to grow well. Plant vegetables in full sun if you can; strong sunlight is a great disinfectant, and the energy plants draw from the sun gives them extra strength. Make sure the soil is well-worked, has good drainage, and is high in organic matter so the soil moisture will remain even. Do not plant the vegetables when the soil and air are too cold. Place plants far enough apart so to avoid crowding; this will allow good air circulation, and the plants will be able to dry out after a rain.

Select disease-resistant varieties. Where possible, buy seeds that are certified as disease-free. Use seeds that have been treated with fungicide, or start your seeds in a sterile soil mix. Your local Cooperative Extension Service can supply you with a list of disease-resistant vegetable varieties for your area.

Rotate your crops. Do not grow the same plant family in the same spot year after year. Repetition of the same crop gives diseases a chance to build up strength. There are three major vegetable families: cole crops (cabbage family) — broccoli, Brussels sprouts, cabbage, cauliflower, kohlrabi, rutabaga, and turnip; cucurbits (cucumber family) — cucumber, gourds, muskmelons, pumpkins, summer and winter squash, and watermelons; and solanaceous plants (tomato and pepper family) — eggplant, Irish potato, pepper, and tomato. After growing a crop from one of these families one year, choose a variety from one of the other families to plant in the same spot the following season.

Don't work with wet plants. Do not work the soil when it is wet. When you're watering the garden, try not to splash water on the plants, especially in hot, humid weather. Handling plants when they're wet spreads diseases.

Control garden pests. Keep insects and other small pests under control. Some insects spread disease; sometimes insects just weaken the plant so that it becomes more susceptible to disease.

,**Don't infect your own plants.** If you smoke, wash your hands well with soap and hot running water before working with tomatoes, peppers, and eggplant. Smokers can infect these plants with tobacco mosaic virus, causing them to mottle, streak, drop their leaves, and die.

Keep your garden clean. Always keep the garden clear of weeds, trash, and plants that have finished producing. Remove infected plants. If you have a sick plant in the garden, identify the problem. If it's a virus or fungus disease, remove the affected plant **as** quickly as possible. Destroy the plant; do not put it in the compost pile. This removal of infected plants Is called "culling." Don't think of it as killing a plant;

Common problems in vegetable gardening

PROBLEM	POSSIBLE CAUSES	POSSIBLE CURES
Plants wilt	Lack of water	Water
	Too much water	Stop watering; improve drainage; pray for less rain
	Disease	Use disease-resistant varieties; keep your garden clean
Leaves and stems are spotted	Fertilizer or chemical burn	Follow instructions; read all fine print; keep fertilizer off plant unless recommended
	Disease	Use disease-resistant varieties of seed; dust or spray; remove affected plants
Plants are weak and spindly	Not enough light	Remove cause of shade or move plants
	Too much water	Improve drainage; stop watering; pray for less rain
	Plants are crowded	Thin out
	Too much nitrogen	Reduce fertilizing
Leaves curl	Wilt	Destroy affected plants; rotate crops; grow disease-resistant varieties
	Virus	Control aphids; destroy affected plants
	Moisture imbalance	Mulch
Plants are stunted — yellow and peaked	Too much water	Reduce watering
	Poor drainage	Improve drainage; add more organic matter before next planting
	Compacted soil	Cultivate soil more deeply
	Too much rubbish	Remove rubbish
	Acid soil	Test, add lime if necessary
	Not enough fertilizer	Test, add fertilizer (this should have been done before planting)

Common problems in vegetable gardening (cont.)

PROBLEM	POSSIBLE CAUSES	POSSIBLE CURES
Plants are stunted — yellow and peaked (cont.)	Insects or diseases	Identify and follow recommendations from your extension service
	Yellow or wilt disease, especially if yellowing attacks one side of the plant first	Spraying will not help; remove affected plants; plant disease-resistant seed in clean soil
Seeds do not come up	Not enough time for germination	Wait
	Too cold	Wait — replant if necessary
	Too dry	Water
	Too wet, they rotted	Replant
	Birds or insects ate them	Replant
	Seed was too old	Replant with fresh seed
Young plants die	Fungus (damping-off)	Treat seed with fungicide or plant in sterile soil
	Rotting	Do not overwater
	Fertilizer burn	Follow recommendations for using the fertilizer more closely; be sure fertilizer is mixed thoroughly with soil
Leaves have holes	Insects, birds, rabbits	Identify culprit and take appropriate measures
	Heavy winds or hail	Plan for better protection
Tortured, abnormal growth	Herbicide residue in sprayer, in grass clippings used as mulch, in drift from another location	Use separate sprayer for herbicides; spray only on still days; use another means of weed control
	Virus	Control insects that transmit disease; remove infected plants (do not put them on the compost pile)
Blossom ends of tomatoes and peppers rot	Dry weather following a wet spell	Mulch to even out soil moisture
	Not enough calcium in soil	Add lime

Common problems in vegetable gardening (cont.)

PROBLEM	POSSIBLE CAUSES	POSSIBLE CURES
Blossom ends of tomatoes and peppers rot (cont.)	Compacted soil	Cultivate
	Too-deep cultivation	Avoid cultivating too deeply
There is no fruit	Weather too cold	Watch your planting time
	Weather too hot	Same as above
	Too much nitrogen	Fertilize only as often and as heavily as needed for the variety
	No pollination	Pollinate with a brush, or by shaking plant (depending on kind); do not kill all the insects
	Plants not mature enough	Wait

Part 2
The Plants

Plants, like people, have definite likes and dislikes. Treat your vegetables right—they'll reward you with a successful season and a healthy harvest.

Vegetables

**How your garden grows:
All the vegetables you can plant,
from seed to harvest—
you'll enjoy them all year.**

Artichoke, globe

Common names: artichoke, globe artichoke
Botanical name: Cynara scolymus
Origin: southern Europe, North America

Varieties
There are very few varieties of artichokes; Green Globe is the variety commonly grown.

Description

The artichoke is a thistlelike, tender perennial that grows three to four feet tall and three to four feet wide. It is grown for its flower buds, which are eaten before they begin to open. The elegant, architectural leaves make the artichoke very decorative, but because it is tender and hates cold weather, it's not for al! gardens. Artichokes, an ancient Roman delicacy, were introduced to France by Catherine de Medici. Later they were taken to Louisiana by the French colonists.

Where and when to grow

Artichokes have a definite preference for a long, frost-free season with damp weather. They cannot handle heavy frost or snow, and in areas where the temperature goes below freezing they need special care and mulching. Artichokes grow best in the four central California counties and on the southern Atlantic and Gulf coasts. In the North, artichokes must be grown in a protected location — the temperature should not be over 70°F by day, or under 55°F at night. Plant them on the average date of last frost for your area.

How to plant

Artichokes are grown from offshoots, suckers, or seed. For best results, start with offshoots or suckers from a reputable nursery or garden center; artichoke plants grown from seed vary tremendously in quality. Artichokes need rich, well-drained

Globe artichoke seedling

Globe artichoke

soil that will hold moisture, and a position in full sunlight. When you're preparing the soil for planting, work in a low-nitrogen (5-10-10) fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Too much nitrogen will keep the plant from flowering. Space the offshoots or suckers three to four feet apart in rows four to five feet apart.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Keep the soil evenly moist.

Special handling

For the roots to survive the winter in cooler areas, cut the plant back to about 10 inches, cover with a bushel basket, and then mulch with about two feet of leaves to help maintain an even soil temperature. Artichokes bear best the second year and should be started from new plants every three to four years.

Pests

Aphids and plume moths plague the artichoke. The plume moth is not a serious problem except in artichoke-growing areas. Aphids can be controlled chemically by spraying the foliage with Malathion or Diazinon or nonchemically by hand-picking or hosing them off the plants. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Part 1.

Diseases

Crown rot may occur where drainage is poor or where the

plants have to be covered in winter. To avoid this problem, don't mulch until the soil temperature drops to40°F, and don't leave the mulch in place longer than necessary.

Cut down on the incidence of disease by planting disease-resistant varieties when they're available, maintaining the general health of your garden, and avoiding handling the plants when they're wet. If a plant does become infected, remove and destroy it so it cannot spread disease to healthy plants. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Part 1.

When and how to harvest

Time from planting to harvest is 50 to 100 days for artichokes grown from suckers; at least a year until the first bud forms when they're grown from seed. To harvest, cut off the globe artichoke bud with one to 11/2 inches of stem before the bud begins to open.

Storing and preserving

Artichokes can be stored in the refrigerator for up to two weeks, or in a cold, moist place up to one month. Artichoke hearts can also be frozen, canned, or pickled. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Cook artichokes in salted water with a squeeze of lemon juice to help retain their color. With hot artichokes serve a Hollandaise sauce; a vinaigrette is delicious when they're cold. They're not as messy to eat as you may imagine — anyway, it's quite legitimate to use your fingers. Stuff artichokes with seafood or a meat mixture and bake them. To stuff, spread open the leaves and remove some of the center leaves; cut off some of the hard tips of the outer leaves. An interesting Italian-style stuffing mix is seasoned breadcrumbs with anchovies, topped with a tomato sauce. For an Armenian-style dish, try ground lamb and bulgur (cracked wheat). Baby artichokes are delicious in stews, or marinated in olive oil, vinegar, and garlic as part of an antipasto. The Romans used to bottle artichokes in vinegar and brine.

Artichoke, Jerusalem

See Jerusalem artichoke

Asparagus

Common name: asparagus
Botanical name: Asparagus officinalis
Origin: Mediterranean

Varieties

Paradise, Mary Washington, and Martha Washington are all rust-resistant varieties.

Description

Asparagus is a long-lived hardy perennial with fleshy roots and fernlike, feathery foliage. The plant grows about three feet tall, and the part you eat is the tender young stem. It takes patience to establish an asparagus bed, but it's worth it; once established, it's there for the duration. Fresh asparagus is a delicacy that commands a devoted following — the first asparagus is as welcome to the gourmet as the first crocus is to the gardener.

Where and when to grow

Asparagus grows well in most areas of the United States, with the exception of the Deep South. It likes a climate where the winters are cold enough to freeze the top few inches of soil and provide it with the necessary period of dormancy. Advance planning is essential when you're starting an asparagus bed, because it's virtually impossible to move the bed once it's established. You'll probably have to order asparagus crowns by mail through a nursery catalog; order early, and plant asparagus four to six weeks before your area's average date of last frost.

How to plant

Asparagus needs well-drained, soil, with a pH over 6. Full sun is best, but asparagus will tolerate a little shade. When you're preparing the soil, spade down eight to 10 inches, and dig in one to 11/2 pounds per 100 square feet of a complete, well-balanced fertilizer. Asparagus is usually grown from crowns; look for well-grown, well-rooted specimens, and be sure they don't dry out. To plant asparagus crowns, dig out a trench or furrow 10 inches wide and 10 to 12 inches deep, and put in two to four inches of loose soil. Space the crowns in the prepared bed in rows 18 inches apart, leaving 12 to 18 inches between plants. Place the crowns

Asparagus

on the soil, with the roots well spread out, and cover with two more inches of soil. As the spears grow, gradually fill in the trench to the top.

Fertilizing and watering

Apply a high-nitrogen (15-10-10) fertilizer after harvesting the spears, at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

It's important to give asparagus enough water when the spears are forming. The plant is hardy and will survive without extra watering, but the stalks may be stringy and woody if you don't keep the soil moist.

Special handling

Do not handle the plants when they are wet. Asparagus does not relish competition, especially from grass plants. Weed thoroughly by hand; control weeds conscientiously, or they will lower your yield considerably.

Pests

The asparagus beetle may attack your plants, but should not be a problem except in commercial asparagus-growing areas. If you do encounter this pest, pick it off, or spray with carbaryl. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Parti.

Diseases

Asparagus can develop rust; you can lessen the incidence of disease by opting for a rust-resistant variety. Generally,

asparagus is a problem-free crop and suitable for the organic gardener. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Part 1.

When and how to harvest

Asparagus should not be harvested until it's three years old; the crowns need time to develop fully. During the third season, cut off the spears at or slightly below soil level. Move a little soil gently aside as you cut the spears so you can see what you're doing — if you cut blind you may damage young spears that have not yet pushed through the surface. Harvest asparagus when the spears are eight to 10 inches tall; if the stalks have started to feather out, it's too late to eat them. Stop harvesting when the stalks start coming up pencil-thin; if you harvest them all, you'll kill the plants.

Storing and preserving

The Romans began to dry their asparagus for out-of-season dining as early as 200 B.C. These days, you can store it up to one week in the refrigerator — keep it upright in an inch or so of water, as you'd keep flowers. You can also freeze or can It, but it's best eaten fresh. Detailed Information on storing and preserving is given in Part 3.

Serving suggestions

In the first century the Emperor Augustus told his minions to carry out executions "quicker than you can cook asparagus," and they knew they'd better get the job done fast. One of the earliest records of asparagus being eaten in America recommends it with "oil and vinegar," which is still one of the best ways. Steam asparagus quickly, or cook it upright in a pan, so the stems cook faster than the tender tips. Fresh asparagus adorned with nothing but a little melted butter is superb — or try it with creamed chicken on toast or laid on toast and topped with a thin slice of prosciutto and cream sauce. Chive mayonnaise, mustard butter, or a caper butter sauce are all splendid alternative dressings for asparagus.

Bean, broad

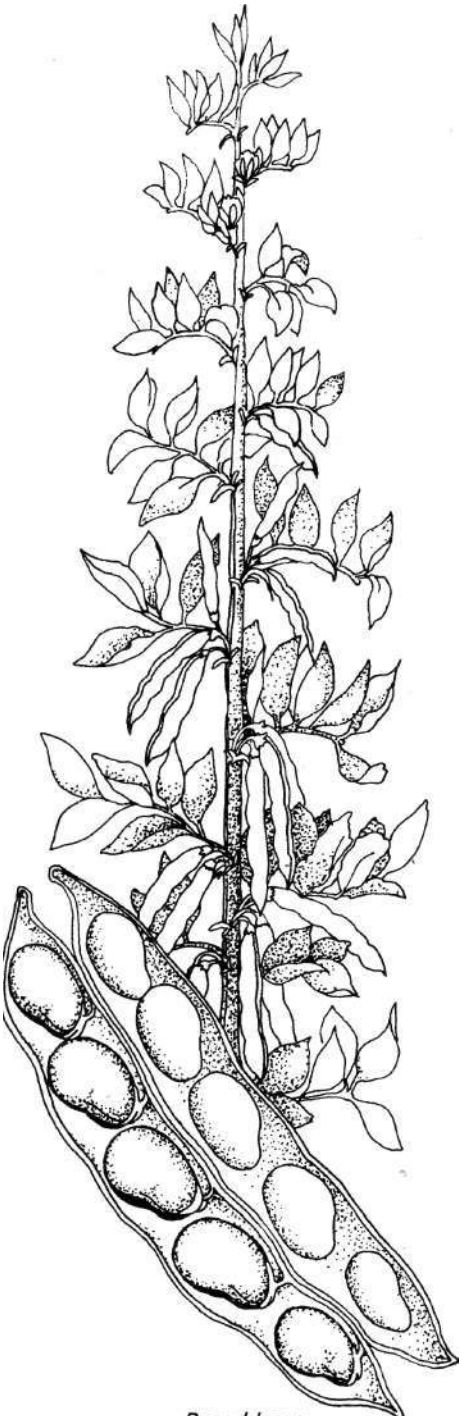
Common names: bean, broad bean, horsebean, fava bean, Scotch bean, Windsor bean
Botanical name: Vicia faba
Origin: Central Asia

Varieties

Long Pod (55 days); Broad Long Pod (57 days). Few varieties are available; grow the variety available in your area.

Description

The broad bean is a bushy, hardy annual that grows three to four feet tall; it has square stems with leaves divided into leaflets. The white flowers are splotched with brown. The pods are six to eight inches long and when mature contain four to six or more light-brown seeds. The broad bean has quite a history. Upper-class Greeks and Romans thought that eating "horse beans" would cloud their vision, but



Broad bean

the species became a dietary staple of the Roman legionnaires (who knew them as fava beans) and later of the poor people in England. In fact, they're not true beans at all but are related to the vetch, another legume.

Where and when to grow

Broad beans will grow in cool weather that would be unsuitable for snap beans. They like full sun but need cool weather to set their pods. They prefer temperatures below 70°F and should be planted very early in the growing season; they will not produce in the summer's heat. In areas where winters are mild, plant broad beans in the fall for a spring crop. In cold areas they can be grown instead of lima beans, which require a warmer and longer growing season.

How to plant

Plant broad beans very early in spring. Choose a location in full sunlight with soil that is fertile, high in organic matter, and well-drained. Broad beans prefer an alkaline soil. When you're preparing the soil for planting, work in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet.

Plant broad bean seeds one to two inches deep in rows four feet apart. When the seedlings are growing strongly, thin them to stand eight to 10 inches apart.

Fertilizing and watering

Beans set up a mutual exchange with soil microorganisms called nitrogen-fixing bacteria, which help them produce their own fertilizer. Some gardeners recommend that if you haven't grown beans in the plot the previous season, you should treat the bean seeds before planting with a nitrogen-fixing bacteria inoculant to help them convert organic nitrogen compounds into usable organic compounds. This is a perfectly acceptable practice but it isn't really necessary; the bacteria in the soil will multiply quickly enough once they've got a growing bean plant to work with.

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Water broad beans before the soil dries out, but don't overwater — wet soil conditions combined with high temperatures are an invitation to root diseases.

Pests

Beans are attacked by aphids, bean beetles, flea beetles, leafhoppers, and mites. Aphids, leafhoppers, and mites can be controlled chemically by spraying with Malathion or Diazinon. Bean beetles and flea beetles can be controlled chemically by spraying with carbaryl. Beans are almost always attacked by large numbers of pests that cannot be controlled by organic methods; this doesn't mean they can't be grown organically, but it does mean that yields may be lower if only organic controls are used. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Part 1.

Diseases

Beans are susceptible to blight, mosaic, and anthracnose. You can cut down on the incidence of disease by planting disease-resistant varieties when they're available, maintaining the general health of your garden, and avoiding handling the plants when they're wet. If a plant does become infected, remove it and destroy it so it can't spread disease to healthy plants. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Part 1.

When and how to harvest

Broad beans can be harvested when the beans are still the size of a pea and used like snap beans. It's more usual, however, to let them reach maturity and eat only the shelled beans. Time from planting to harvest is about 85 days.

Storing and preserving

Unshelled beans can be kept up to one week in the refrigerator. You can freeze, can, or dry the shelled beans. Dried shelled broad beans can be stored in a cool, dry place for 10 to 12 months. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Broad beans are good steamed and served with a light white or cheese sauce. Or top steamed broad beans with a little sauteed parsley, garlic, and onion. Use them in a casserole with onions, tomatoes, and cheese, or add them to a hearty vegetable soup along with any other vegetables you've got on hand. You can prepare broad beans any way you prepare lima beans.

Bean, dry

Common names: pinto beans, navy beans, horticultural beans, flageolet
Botanical name: Phaseolus species
Origin: South Mexico, Central America

Varieties

Dry beans are so called because the mature seeds are generally dried before they're eaten. There are many types, and some of the most common are cranberry. Great Northern, michilite, pinto, red kidney, white marrowfat, and pea beans. Horticultural beans, the genuine French flageolets, are a type of dry bean highly regarded by gourmets; they're usually eaten in the green-shell stage. Ask your Cooperative Extension Service for specific recommendations for your area.

Description

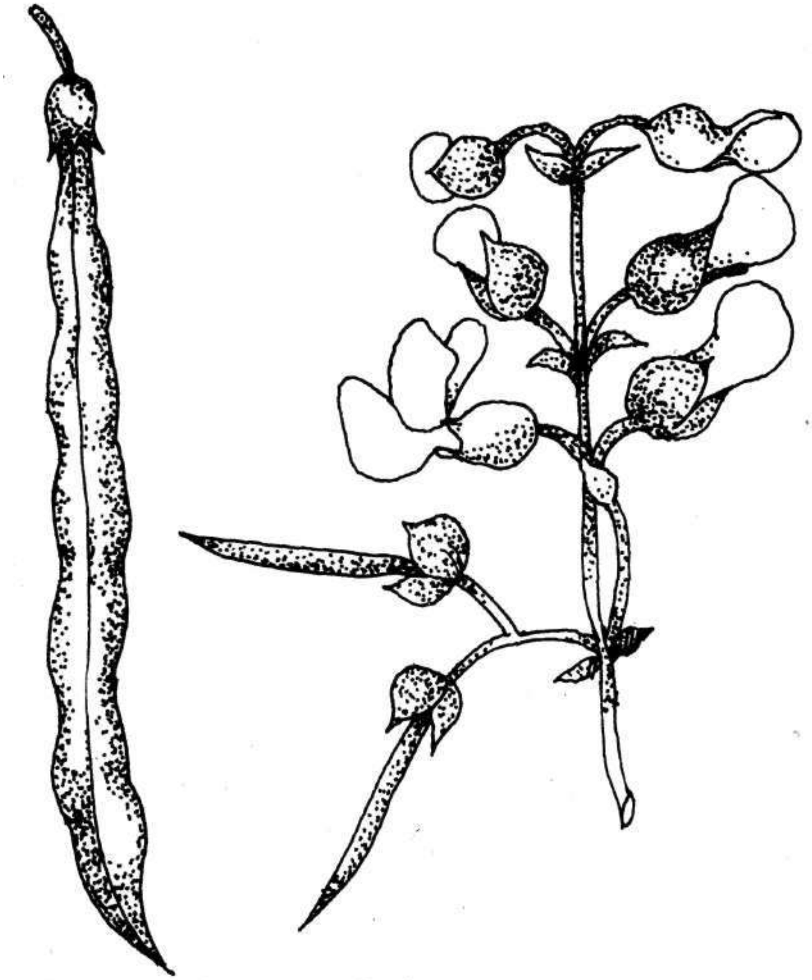
Dry beans are tender annuals. Their leaves are usually composed of three leaflets, and the small flowers are pale yellow or white. Dry beans are seldom planted in the home vegetable garden because it's so easy and inexpensive to buy them. They're fairly easy to grow, however, and give good yields, so if you have space in your garden you may want to try them.

You can grow either bush or pole varieties of beans. Bushes are generally easier to handle; they grow only one to two feet tall, and they mature earlier. Pole beans require a trellis for support; they grow more slowly, but produce more beans per plant.

Where and when to plant

Beans require warm soil to germinate and should be planted on the average date of last spring frost. Use the length of your growing season and the number of days the variety takes to mature to figure your latest planting date. If you need to sow before your area's average date of last frost, start the seed indoors in peat pots and transplant the seedlings when the soil has warmed up. Time your planting so that the beans will mature before very hot weather; they will not set pods at temperatures over80°F.

You can plant bush beans every two weeks to extend the harvest, or start with bush beans and follow up with pole beans. In some parts of the country — California, for example — you can get two crops by planting in the spring and then planting again in early fall for a winter harvest.



Dry bean

How to plant

After the last frost is over, choose a bed in full sunlight; beans tolerate partial shade, but partial shade tends to mean a partial yield. When you're preparing the soil, mix in a pound of low-nitrogen (5-10-10) fertilizer — don't use a high-nitrogen fertilizer; too much nitrogen will promote growth of foliage but not of the beans. Bean seeds may crack and germinate poorly when the moisture content of the soil is too high. Don't soak the seeds before planting, and don't overwater immediately afterwards.

Plant the bean seeds an inch deep. If they're bush beans, plant the seeds three to four inches apart in rows at least 18 to 24 inches apart. Seeds of pole beans should be planted four to six inches apart in rows 30 to 36 inches apart. Or plant in inverted hills — five or six seeds to a hill, and 30 inches of space around each hill. When the seedlings are large enough to handle, thin the plants to four to six inches apart. Cut the seedlings with scissors at ground level; be careful not to disturb the others. Beans don't mind being a little crowded — in fact, they'll use each other for support.

Fertilizing and watering

Beans set up a mutual exchange with soil microorganisms called nitrogen-fixing bacteria, which help them produce their own fertilizer. Some gardeners recommend that if you haven't grown beans in the plot the previous season, you should treat the bean seeds before planting with a nitrogen-fixing bacteria inoculant to help them convert organic nitrogen compounds into usable organic compounds. This is a perfectly acceptable practice but it isn't really necessary; the bacteria in the soil will multiply quickly enough once they've got a growing bean plant to work with.

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Keep the soil moist until the beans have pushed through the ground. Water regularly if there's no rain, but remember that water on the flowers can cause the flowers and small pods to fall off. When the soil temperature reaches 60°F you can mulch to conserve moisture.

Special handling

Don't touch bean plants when they're wet or covered with heavy dew; handling or brushing against them when they're wet spreads fungus spores. Cultivate thoroughly but with care, so that you don't disturb the bean plants' shallow root systems.

If you're planting pole beans, set the trellis or support in position before you plant or at the same time. If you wait until the plants are established, you risk damaging the roots when you set the supports. Make sure the support will be tall enough for the variety you're growing.

Pests

Beans may be attacked by aphids, bean beetles, flea beetles, leafhoppers, and mites. Aphids, leafhoppers, and mites can be controlled chemically by spraying with Malathion or Diazinon. Bean beetles and flea beetles can be controlled chemically by spraying with carbaryl. Beans are almost always attacked by large numbers of pests that cannot be controlled by organic methods. This doesn't mean the organic gardener can't grow them, but yields may be lower if only organic controls are used. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Parti.

Diseases

Beans are susceptible to blight, mosaic, and anthracnose. You can cut down on the incidence of disease by planting disease-resistant varieties when they're available, maintaining the general health of your garden, and avoiding handling the plants when they're wet. If a plant does become infected, remove and destroy it so it cannot spread disease to healthy plants. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Part 1.

When and how to harvest

Harvest dry beans when the plants have matured and the leaves have turned completely brown. At this time the seeds should be dry and hard — bite a couple of seeds; if you can hardly dent them they're properly dry and ready to harvest.

Storing and preserving

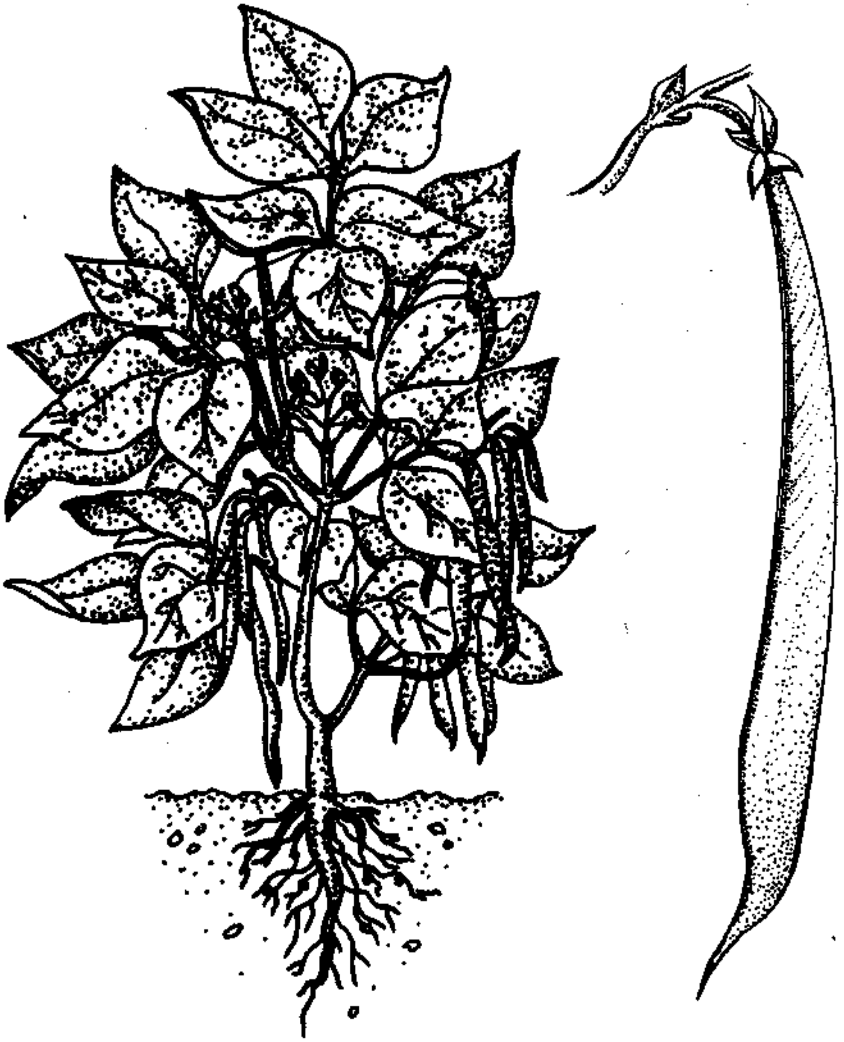
Unshelled beans can be kept up to one week in the refrigerator. You can freeze, can, or dry the shelled beans, and they can also be sprouted. Dried shelled beans

can be stored in a cool, dry place for 10 to 12 months. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Dried beans are tremendously versatile and have the added advantage of being interchangeable in many recipes. They're also nourishing and figure prominently in vegetarian recipes. Chili and baked beans are two of the famous dishes that depend upon dried beans, and beans are essential to the famous French Cassoulet — a hearty stew that combines beans with pork, chicken, sausage, or a mixture of all three depending on the region the cook comes from. Try retried pinto beans as a filling for tacos. Add sausage or ham to a thick bean soup for a winter supper to cheer up the chilliest evening.

Bean, green or snap



Green bean

Common names: bean, green bean, snap bean, string bean, French bean, wax bean, pole bean, bush bean, stringless bean
Botanical name: Phaseolus vulgaris
Origin: South Mexico, Central America

Varieties

The most commonly grown beans are the green or snap bean and the yellow or wax variety. Since 1894, when Burpee introduced the Stringless Green Pod, most of these beans have been stringless. The following are only a few of the varieties available. Ask your Cooperative Extension Service for specific recommendations for your area.

Green bush (green snap bean, bush): Astro (53 days); Blue Lake (56 days); Contender (53 days); Provider (53 days); Tendergreen (57 days); Tender Crop (53 days) — all resistant to bean mosaic virus. **Wax bush** (yellow snap bean, bush): Cherokee Way (55 days); Early Wax (50 days) — both resistant to bean mosaic virus. **Green pole** (green snap bean, pole): Blue Lake (65 days); McCaslan (65 days) — both resistant to bean mosaic virus; Kentucky Wonder (65 days).

Description

Beans are tender annuals that grow either as bushes or vines. Their leaves are usually composed of three leaflets; their flowers are pale yellow, lavender, or white. The size and color of the pods and seeds vary. Snap beans require a short growing season — about 60 days of moderate temperatures from seed to the first crop. They'll grow anywhere in the United States and are an encouraging vegetable for the inexperienced gardener. The immature pod is the part that's eaten. Beans grow as bushes or vines. Bushes are generally easier to handle; they grow only one to two feet tall, and they mature earlier. Pole beans require a trellis for support; they grow more slowly, but produce more beans per plant.

Where and when to grow

Because many varieties have a short growing season, beans do well in most areas, whatever the climate. They require warm soil to germinate and should be planted on the average date of last spring frost. You can plant bush beans every two weeks to extend the harvest, or you can start with bush beans and follow up with pole beans. In some parts of the country — California, for example — you can get two crops by planting in the spring and then planting again in early fall for a winter harvest. Use the length of your growing season and the number of days the variety takes to mature to figure your latest planting date. If you need to sow before your area's average last frost date, start the seed indoors in peat pots and transplant the seedlings when the soil has warmed up. Time your planting so the beans will mature before very hot weather; they will not set pods at temperatures over 80°F.

How to plant

After the last frost is over, choose a bed in full sunlight; beans tolerate partial shade, but partial shade tends to mean a partial yield. Prepare the soil by mixing in a pound of 5-10-10 fertilizer — don't use a high-nitrogen fertilizer, because too much nitrogen will promote growth of foliage but not of the beans. Work the fertilizer into the soil at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet.

Bean seeds may crack and germinate poorly when the moisture content of the soil is too high. Don't soak the seeds before planting, and don't overwater immediately afterward.

Plant seeds of all varieties an inch deep. If you're planting bush beans, plant the seeds two inches apart in rows at least 18 to 24 inches apart. Seeds of pole beans should be planted four to six inches apart in rows 30 to 36 inches apart. Or plant them in inverted hills, five or six seeds to a hill, with 30 inches of space around each hill. For pole varieties, set the supports or trellises at the time of planting.

When the seedlings are growing well, thin the plants to four to six inches apart. Cut the seedlings with scissors at ground level; be careful not to disturb the others. Beans don't mind being a little crowded; in fact, they'll use each other for support.

Fertilizing and watering

Beans set up a mutual exchange with soil microorganisms called nitrogen-fixing bacteria, which help them produce their own fertilizer. Some gardeners recommend that if you haven't grown beans in the plot the previous season, you should treat the bean seeds before planting with a nitrogen-fixing bacteria inoculant to help them convert organic nitrogen compounds into usable organic compounds. This is a perfectly acceptable practice but it isn't really necessary; the bacteria in the soil will multiply quickly enough once they've got a growing bean plant to work with.

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Keep the soil moist until the beans have pushed through the ground. Water regularly if there is no rain, but remember that water on the flowers can cause the flowers and small pods to fall off. When the soil temperature reaches 60°F you can mulch to conserve moisture.

Special handling

Don't bother bean plants when they're wet or covered with heavy dew; handling or brushing against them when they're wet spreads fungus spores. Cultivate thoroughly but with care, so that you don't disturb the bean plants' shallow root systems. If you're planting pole beans, set the trellis or support in position before you plant or at the same time. If you wait until the

plants are established, you risk damaging the roots when you set the supports. Make sure the support will be tall enough for the variety of beans you're growing.

Pests

Beans may be attacked by aphids, bean beetles, flea beetles, leafhoppers, and mites. Aphids, leafhoppers, and mites can be controlled chemically by spraying with Malathion or Diazinon. Bean beetles and flea beetles can be controlled chemically by spraying with carbaryl. Beans are almost always attacked by large numbers of pests that cannot be controlled by organic methods. This does not mean the organic gardener can't grow them, but yields may be lower if only organic controls are used. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Part 1.

Diseases

Beans are susceptible to blight, mosaic, and anthracnose. You can cut down on the incidence of disease by planting disease-resistant varieties when they're available, maintaining the general health of your garden, and avoiding handling the plants when they're wet. If a plant does become infected, remove and destroy it so it cannot spread disease to healthy plants. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Part 1.

When and how to harvest

Time from planting to harvest is 50 to 60 days for bush beans, 60 to 90 days for pole beans. Harvest the immature pods, and continue removing the pods before they become mature, or the plant will stop producing. Once the seeds mature, the plant dies. Do not harvest when the weather is very hot or very cold.

Storing and preserving

Snap beans are a snap to store. They'll keep up to one week in the refrigerator, but don't wash them until you're ready to cook them. You can also freeze, can, dry, or pickle them. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Really fresh, tender snap beans are delicious eaten raw; they make an unusual addition to a platter of crudites for dipping. They're also good lightly cooked and tossed with diced potatoes and a little onion and bacon for a delightful hot bean salad. Try them on toast with a light cheese sauce for lunch. And vary everyone's favorite bean dish by replacing the classic Amandine sauce with a Hollandaise or mushroom sauce. Or try tossing them with a few thinly sliced mushrooms and onions that have been lightly sauteed in butter. You can also cut snap beans in lengths and saute them all together with diced potatoes, carrots, and onions for an interesting vegetable dish. Purists will object that this means cooking the beans too long, but you can always add them halfway through the cooking time to preserve their crispness. Well-seasoned, this is a good, filling, vegetable dish for a cold day. On their own, snap beans take well to many spices, including basil, dill, marjoram, and mint.

Bean, lima

Common names: bean, lima bean, butter bean, civit bean
Botanical name: Phaseolus lunatus
Origin: South Mexico, Central America

Varieties

Bush lima: Burpee Improved Bush (75 days); Fordhook 242 (75 days) — both resistant to bean mosaic; Allgreen (67 days); Thorogreen (66 days). **Pole lima:** King of the Garden (90 days); Prizetaker (90 days).

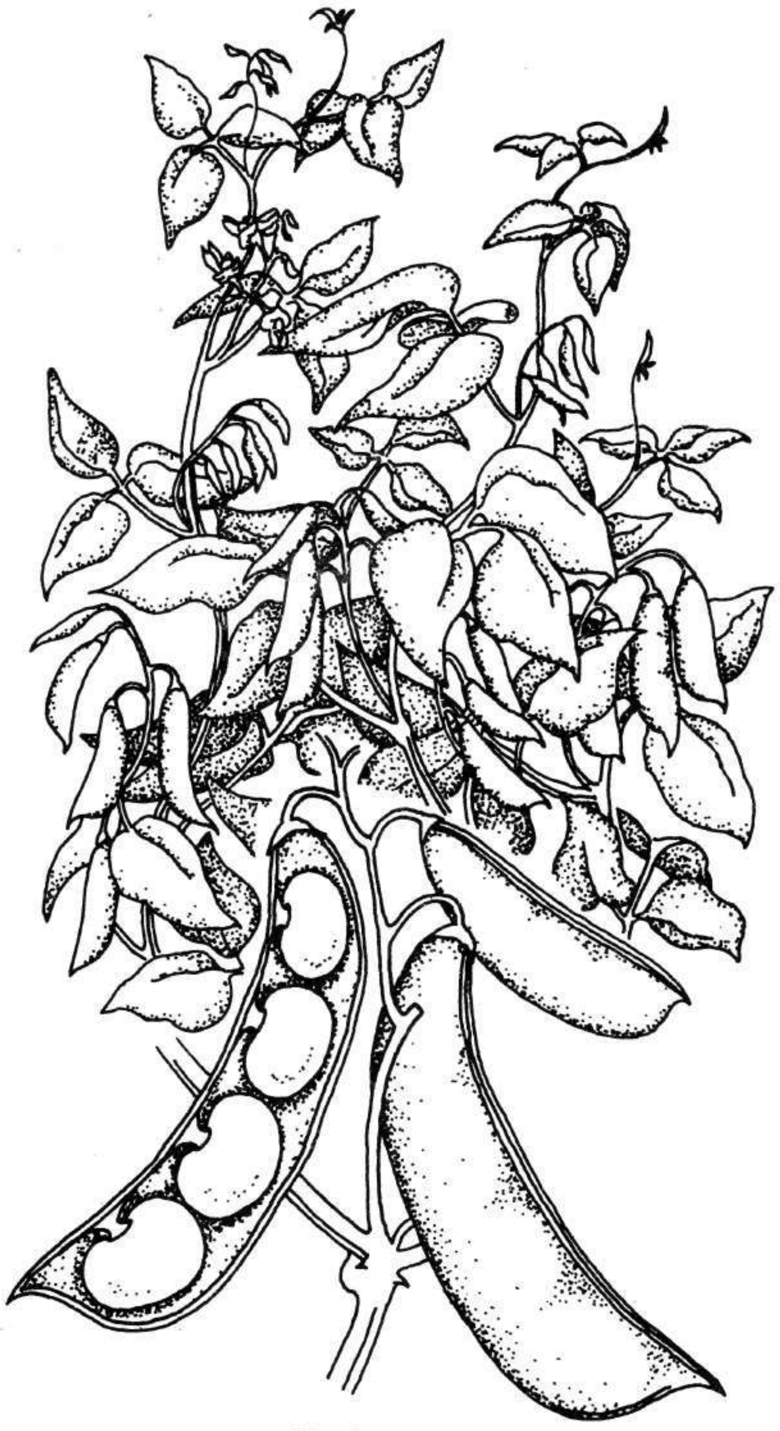
Description

This tender, large-seeded annual bean grows as either a bush or a vine. With this type of bean the mature seed is eaten, not the entire pod. Lima beans need warmer soil than snap beans in order to germinate properly, and they need higher temperatures and a longer growing season for a good crop.

Bush lima beans are generally easier to handle than pole varieties; bushes grow only one to two feet tall, and they mature earlier. Pole beans require a trellis for support; they grow more slowly, but produce more beans per plant.

Where and when to grow

Lima beans require warm soil (five days at a minimum



Lima bean

temperature of 65°F) to germinate, and should be planted two weeks after the average date of last spring frost. Use the length of your growing season and the number of days the variety takes to mature to figure your latest planting date. If you need to sow before your area's average last frost date, start the seed indoors in peat pots and transplant them when the soil has warmed up. Time your planting so the beans will mature before very hot weather; they will not set pods at temperatures over 80°F.

Plant bush beans every two weeks to extend the harvest, or start with bush beans and follow up with pole beans. Because limas need a long stretch of pleasant weather, the slower-growing pole varieties are difficult to raise successfully where the growing season is short.

How to plant

After the last frost is over, choose a bed in full sunlight; beans tolerate partial shade, but partial shade tends to mean a partial yield. Prepare the soil by mixing in a pound of 5-10-10 fertilizer; don't use a high-nitrogen fertilizer, because too much nitrogen will promote growth of the foliage but not of the beans.

Plant seeds of all varieties an inch deep. If you're planting bush limas, plant the seeds two inches apart in rows at least 18 to 24 inches apart. Seeds of pole beans should be planted four to six inches apart in rows 30 to 36 inches apart, or plant them in inverted hills, five or six seeds to a hill, with 30 inches of space around each hill. For pole varieties, set supports or

trellises at the time of planting.

When the seedlings are growing well, thin the plants to four to six inches apart. Cut the seedlings with scissors at ground level; be careful not to disturb the others. Beans don't mind being a little crowded; in fact, they'll use each other for support.

Fertitizing and watering

Beans set up a mutual exchange with soil microorganisms called nitrogen-fixing bacteria, which help them produce their own fertilizer. Some gardeners recommend that if you haven't grown beans in the plot before, you should treat the bean seeds before planting with a nitrogen-fixing bacteria inoculant to help them convert organic nitrogen compounds into usable organic compounds. This is a perfectly acceptable practice, but it isn't really necessary; the bacteria in the soil will multiply quickly enough once they've got a growing bean plant to work with.

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Bean seeds may crack and germinate poorly when the moisture content of the soil is too high. Don't soak the seeds before planting, and don't water immediately afterward. Keep the soil moist until the beans have pushed through the ground. Water regularly if there is no rain, but avoid getting water on the flowers; this can cause the flowers and small pods to fall off. You can mulch to conserve moisture when the soil temperature reaches 60°F.

Special handling

Don't handle bean plants when they're wet or covered with heavy dew; handling or brushing against them when they're wet spreads fungus spores. Cultivate thoroughly but with care, so you don't disturb the bean plants' shallow root systems.

If you're planting pole beans, set the trellis or support in position before you plant or at the same time. If you wait until the plants are established, you risk damaging the roots when you set the supports. Make sure the support will be tall enough for the variety of beans you're planting.

The large lima bean seed sometimes has trouble pushing through the soil, although this should not happen if the soil is well worked. If your soil tends to cake, you can cover the seeds with sand, vermiculite, or a peat moss/vermiculite mix instead.

Pests

Beans may be attacked by aphids, bean beetles, flea beetles, leafhoppers, and mites. Aphids, leafhoppers, and mites can be controlled chemically by spraying with Malathion or Diazinon. Bean beetles and flea beetles can be controlled chemically by spraying with carbaryl. Beans are almost always attacked by large numbers of pests that cannot be controlled by organic methods. This doesn't mean the organic gardener can't grow them, but yields may be lower if only organic controls are used. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Part 1.

Diseases

Beans are susceptible to blight. mosaic, and anthracnose. You can cut down on the incidence of disease by planting disease-resistant varieties when they're available, maintaining the general health of your garden, and avoiding handling the plants when they're wet. If a plant does become infected, remove and destroy it so it cannot spread disease to healthy plants. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Parti.

When and how to harvest

Time from planting to harvest is about 60 to 75 days for bush limas and 85 to 110 days for pole limas. Harvest when the pods are plump and firm; if you leave them too long the beans will get tough and mealy. If you pick the pods promptly, limas will continue to yield until the first frost. In warmer climates, bush limas should give you two or three pickings.

Storing and preserving

Unshelled lima beans can be kept up to one week in the refrigerator. Shelled lima beans freeze satisfactorily; they can also be canned or dried. Dried shelled limas can be stored in a cool, dry place for 10 to 12 months. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Try limas raw for an unusual treat. Serve them in a salad with thinly sliced red onion, parsley, and a vinaigrette dressing, or marinate them for 24 hours in oil, lemon juice, and freshly chopped dill. Cook limas just until tender and serve with a

creamy sauce. For a tangy treatment, bake them in a casserole with honey, mustard, and yogurt.

When you're preparing the soil for planting, dig in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Because the only seeds you may be able to get are not very reliable in growth, plant

Bean, mung

Common name: mung bean
Botanical name: Phaseolus aureus
Origin: India, Central Asia

Varieties
Few varieties are available. Grow whichever variety is available in your area, or plant the seeds that are sold for sprouting.

Description

The mung bean is a bushy annual that grows about **21/2** to three feet tall, and has many branches with typical, hairy, beaniike leaves. The flowers are yellowish-green with purple streaks and produce long, thin, hairy pods containing nine to 15 small, yellow seeds. The seeds are used to produce bean sprouts.

Where and when to grow

Mung beans can be grown in any area of the United States that has 90 days of frost-free temperatures. Plant them on the average date of last frost for your area.

How to plant

Mung beans grow best in full sun, in a rich well-drained soil.

Mung bean

Mung bean seedling

the seeds several at a time. Plant them an inch deep and 18 to 20 inches apart In wide rows 18 to 24 inches apart. When the seedlings are about two inches tall, thin them to leave the strongest of each group growing. Cut off the extra seedlings at ground level to avoid disturbing the survivor's roots.

Fertilizing and watering

Beans set up a mutual exchange with soil microorganisms called nitrogen-fixing bacteria, which help them produce their own fertilizer. Some gardeners recommend that if you haven't grown beans in the plot the previous season, you should treat the bean seeds before planting with a nitrogen-fixing bacteria inoculant to help them convert organic nitrogen compounds into usable organic compounds. This is a perfectly acceptable practice but it isn't really necessary; the bacteria in the soil will multiply quickly enough once they've got a growing bean plant to work with.

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Mung beans don't like to dry out between waterings. If it doesn't rain, keep them well-watered.

Pests

Mung beans have no serious pest problems.

Diseases

Mung beans have no serious disease problems.

When and how to harvest

It usually takes about 90 to 100 days for mung beans to mature, and you can expect one to two pounds of seeds from a 10-foot row. Harvest them as soon as a few of the pods begin to split. If the pods are picked when they are too young they won't store or sprout. Remove the seeds from pods when you harvest them.

Storing and preserving

Mung beans are usually grown for sprouting. Unshelled beans can be kept up to one week in the refrigerator; shelled beans, naturally dried, can be stored in a cool, dry place for 10 to 12 months. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Bean sprouts turn up in all sorts of Chinese dishes. They're good in salads and sandwiches — vegetarians love them, and rightly so, because they have a high Vitamin C content.

Bean, soy

See Soybean

Beet

Common name: beet
Botanical name: Beta vulgaris
Origin: southern Europe

Varieties

Early Wonder (53 days); Burpee's Golden (55 days); Ruby Green (56 days); Cylindra, also called Formanova or Tendersweet (60 days); Long Season, also called Winter Keeper (80 days).

Description

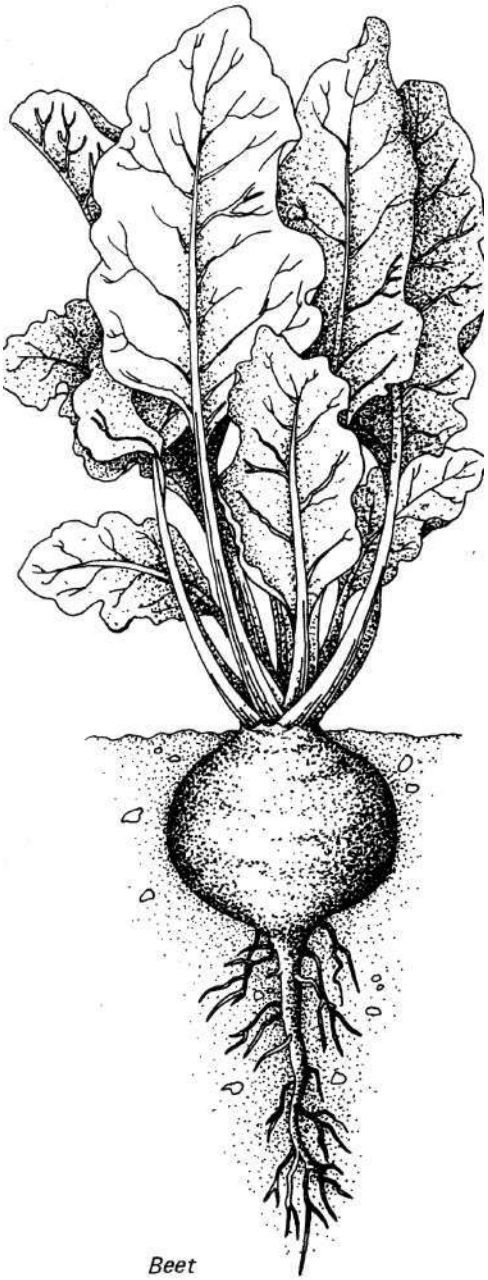
The beet is grown as an annual, although technically it's a biennial. It originated in the Mediterranean, where it existed first as a leafy plant, without the enlarged root we grow it for these days. Swiss chard, which is a bottomless beet, is an improved version of the early, leafy beets. The modern beet has a round or tapered swollen root — red, yellow, or white — from which sprouts a rosette of large leaves. The leaves as well as the root can be eaten.

Where and when to grow

Beets can tolerate frost and do best in the cooler areas of the country, but they'll go to seed without making roots if the plants get too cold when they're young. Plant beets two to three weeks before the average date of last frost. They're planted as a winter crop in the South. If you live in a hot climate you'll need to pay special attention to watering and mulching to give seedlings a chance to establish themselves. In very hot weather the roots become woody.

How to plant

Beets can tolerate shade and thrive in well-worked, loose soil that is high in organic matter. They don't like a very acid soil, and they need a lot of potassium. Before planting, work a complete.



Beet

well-balanced fertilizer into the soil at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Remove stones and other obstacles, and break up any lumps In the soil that might cause the roots to become malformed.

Beets are grown from seed clusters that are slightly smaller than a pea and contain several seeds each. Plant the clusters an inch deep and an inch apart in rows spaced 12 to 18 inches apart. The seedlings may emerge over a period of time so that you've got a group of seedlings of different sizes. Since several seedlings will emerge from each seed cluster, they must be thinned to two to three inches apart when the seedlings develop true leaves. Eat thinned seedlings like spinach; they do not transplant well. Plant all the seed clusters — most seeds store well, but these clusters have only a short period of viability.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

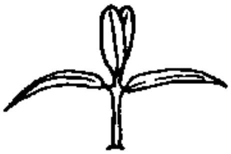
Be sure to provide plenty of water for the tender young roots — lack of moisture will result in stringy, tough vegetables.

Special handling

Cultivate by hand regularly; beets do not like competition from weeds. Take care, because the roots are shallow and easily damaged.

Pests

Beets have no serious pest problems. They are a good crop for the organic gardener.



Beet seedling

Diseases

Beets have no serious disease problems.

When and how to harvest

Time from planting to harvest is from 40 to 80 days. It takes about 60 days for a beet to reach 11/2 inches in diameter — a popular size for cooking or pickling — although they'll get bigger quickly if they have plenty of water. Pull them up when they're the size you want. Twist the leaves off rather than cutting them off; this prevents "bleeding," which causes less intense color and, some people claim, less flavor.

Storing and preserving

You can store beets in the refrigerator for one to three weeks; store the greens in a plastic bag in the refrigerator up to one week.

Beets will keep for five to six months in a cold, moist place. You can also freeze, dry, and can both the root and the greens, (use the recipe for "greens"). You can even pickle the root. So there's never any problem figuring what to do with the excess crop. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Beets are more versatile than they're often given credit for. Eat them raw, or serve the tops raw as a salad green — if you don't cook them, you'll retain some of the vitamins normally lost in cooking. If you cook beets in their skins, the skins will slip off readily at the end of the cooking time. Hot, try them dressed with orange juice and topped with a few slivers of green onion, or glaze them with orange marmalade. Or keep the dressing simple: just a little butter, lemon juice, and seasoning. Beets are the basis of the thick, delicious Russian soup called borscht. Serve borscht with a dollop of sour cream.

Belgian endive

See Chicory

Black-eyed pea

See Pea, black-eyed

Broad bean

See Bean, broad

Broccoli

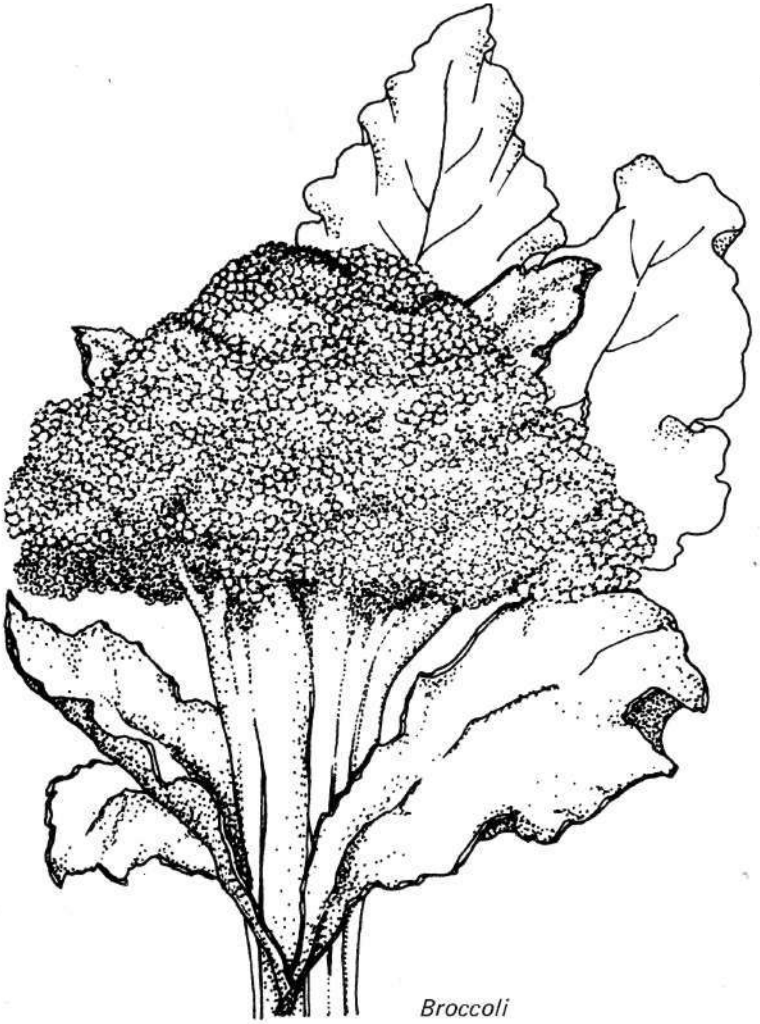
Common names: broccoli, Italian broccoli. Calabrese, brocks
Botanical name: Brassica oleracea italica
Origin: Mediterranean

Varieties

Green Comet (40 days); Premium Crop (60 days); Royal Purple Head (90 days, resistant to disease, yellow virus).

Description

This hardy biennial, grown as an annual, is a member of the cabbage or cole family. It grows 11/2 to 21/2 feet tail and looks a bit like a cauliflower that hasn't quite gotten itself together. The flower stalks are green, purple, or white; when it comes to the white-budded ones, the U.S. government has trouble deciding where a broccoli stops and a cauliflower starts. The flowers of all of them are yellow, but they're usually eaten while they're still in bud, before they bloom. Americans didn't discover



Broccoli

broccoli until the 1920s, even though this vegetable had been an Old World favorite well before that date.

Broccoli has four stages of growth: (1) rapid growth of leaves; (2) formation of the head (which is the part you eat); (3) a resting period while the embryonic blossoms are being formed; and (4) development of the stalk, flowers, and seeds. The head formation stage is essential for the production of the vegetable, but not at all necessary for the survival of the plant. Broccoli that's held in check by severe frost, lack of moisture, or too much heat will bolt, which means it will go directly to seed without bothering to form a head at all.

As with other cole family crops, you can grow broccoli in a container on the patio or indoors — a single broccoli plant in an eight-inch flower pot might make a novel houseplant. You can also grow broccoli as an accent in a flower bed.

Where and when to grow

Broccoli is frost-hardy and can tolerate low 20°F temperatures. It's a cool season crop and does best with day temperatures under 80°F and night temperatures 20°F lower. Weather that's too cold or too warm will cause the plants to bolt without forming a head. Broccoli will grow in most areas of the United States at one season or another but is not a suitable crop for very hot climates. Time planting so that you'll harvest broccoli during cool weather. In cold-winter areas, plant for summer to early fall harvest. In mild climates, plant for late spring or fall harvest; in the South, plant for harvest in late fall or winter.

How to plant

Broccoli likes fertile, well-drained soil with a pH within the 6.5 to 7.5 range — this discourages disease and lets the plant make the most of the nutrients in the soil. Broccoli is usually grown from transplants except where there's a long cool period, in which case you can sow seed directly in the garden in fall for winter harvest.

When you're preparing the soil for planting, work in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. If you have sandy soil or your area is subject to heavy rains, you'll probably need to supplement the nitrogen content of the soil. Use about a pound of nitrogen fertilizer for a 10-foot row.

Plant transplants that are four to six weeks old with four or five true leaves. If the transplants are leggy or have crooked stems, plant them deeply (up to the first leaves) so they won't grow to be top-heavy. Plant the seedlings 18 to 24 inches apart, in rows 24 to 36 inches apart. Plan for only a few heads at a time, or plant seeds and transplants at the same time for succession crops — you'll get the same result by planting early and midseason varieties at the same time. If you're planting seeds, set them half an inch deep and three inches apart, and thin them when they're big enough to lift by the true leaves. You can transplant the thinned seedlings.

Broccoli seedling

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Broccoli needs abundant soil moisture and cool moist air for the best growth. Cut down on watering as the heads approach maturity.

Pests

The cabbage family's traditional enemies are cutworms and caterpillars. However, cutworms, cabbage loopers, and imported cabbage worms can all be controlled by spraying with bacillus thuringiensis, an organic product also known as Dipel or Thungicide. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Part 1.

Diseases

Such cabbage family vegetables as broccoli are susceptible to yellows, clubroot, and downy mildew. Planting resistant varieties, rotating crops from year to year, and maintaining the general health of your garden will cut down on the incidence of disease. If a plant does become infected, remove it before it can spread disease to healthy plants. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Part 1.

When and how to harvest

Broccoli grown from seed will take 100 to 150 days to mature, and

some transplants can be harvested in 40 to 80 days. Harvesting can continue over a relatively long period. Cut the central head v^ith five to six inches of stem, when the head is well developed and before it begins to loosen and separate — if the small yellow flowers have started to show, it's past the good-eating stage. Leave the base of the plant and some outer leaves to encourage new growth. In many varieties small clusters will grow in the angles of the leaves and can be harvested later.

Storing and preserving

Broccoli can be stored in the refrigerator up to one week, or in a cold, moist place for two to three weeks. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

The good taste of broccoli has been appreciated since way back. Pliny the Elder wrote in the second century that it was much in favor with the Romans. The classically American way to serve broccoli is with a cheese or Hollandaise sauce, au gratin, or in casseroles. It's also delicious raw, broken into flowerets and used in a salad or with a dipping sauce; the small flowerets are decorative on a platter of raw vegetables. If you've got stalks left over after using the head for salads, parboil them and then saute them in oil with a little onion and garlic. To make sure the stems cook adequately without overcooking the tender tops, cook, broccoli like asparagus — upright in a tall pot so that the stems boil and the tops steam.

Brussels sprout

Common names: Brussels sprouts, sprouts
Botanical name: Brawsica oleracea gemmifera
Origin: Europe, Mediterranean

Varieties

jade Cross (90 days) is resistant to yellows virus.

Description

If you've never seen Brussels sprouts outside of a store, you may be quite impressed by the actual plant. Miniature cabbagelike heads, an inch or two in diameter, sprout from a tall, heavy main stem, nestled in among large green leaves. Brussels sprouts belong to the cabbage or cole family and are similar to cabbage in their growing habits and requirements. They're hardy and grow well in fertile soils, and they're easy to grow in the home garden if you follow correct pest control procedures. Don't try growing the Brussels sprout as a houseplant — it's too big to domesticate.

Brussels sprouts have four stages of growth: (1) rapid growth of leaves; (2) formation of the heads (which is the part you eat); (3) a resting period while the embryonic blossoms are being formed; and (4) development of the stalk, flowers, and seeds. The head formation stage is essential for the production of the vegetable, but not at all necessary for the survival of the plant. Brussels sprouts that are held in check by severe frost, lack of moisture, or too much heat will bolt, which means that they'll go directly to seed without bothering to form a head at all.

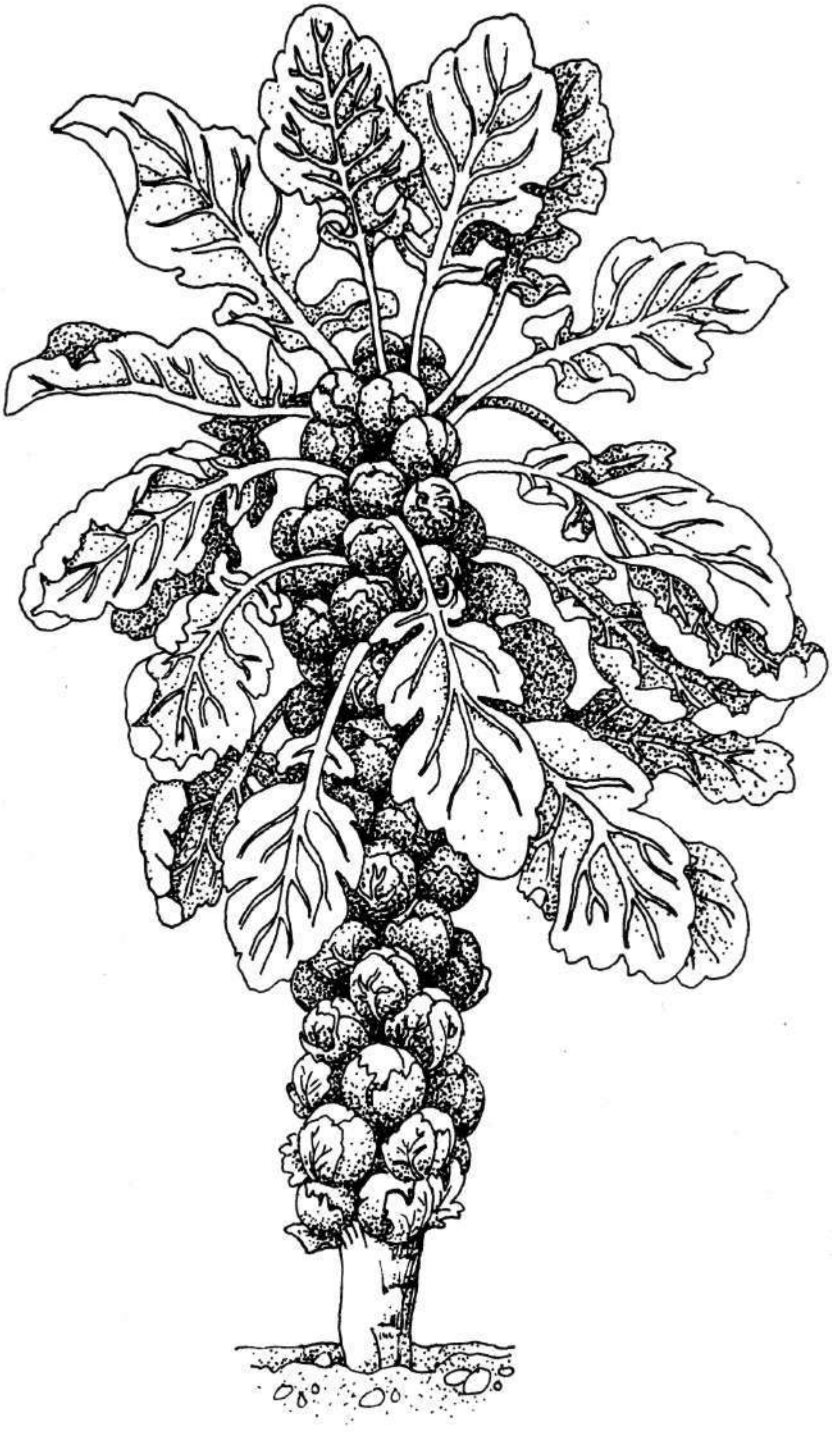
Where and when to grow

Brussels sprouts are frost-hardy— in fact, they're the most cold-tolerant of the cole family vegetables — and can tolerate low 20°F temperatures. Brussels sprouts do best in a cool growing season with day temperatures under 80°F and night temperatures 20°F lower. Weather that's too cold for too long or too warm will make them taste bitter; if the sprouts develop in hot weather, they may not form compact heads, but will remain loose tufts of leaves. Brussels sprouts are not a suitable crop for very hot climates, although they will grow in most areas of the United States in one season or another. Time planting so that you harvest Brussels sprouts during cool weather. If your area has cold winters, plant for summer to early fall harvest. In mild climates, plant for late spring or fall harvest. In the South, plant for harvest in late fall or winter.

How to plant

Brussels sprouts like fertile, well-drained soil with a pH within the 6.5 to 7.5 range — this discourages disease and lets the plant make the most of the nutrients in the soil. They're usually grown from transplants, except where there's a long cool period, in which case seeds are sown directly in the garden in fall for winter harvest.

When you're preparing the



Brussels sprout

soil for planting, work in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. If you have sandy soil or your area is subject to heavy rains, you'll probably need to supplement the nitrogen content of the soil. Use about a pound of nitrogen fertilizer for a 10-foot row.

Plant transplants that are four to six weeks old, with four to five true leaves. If the transplants are leggy or have crooked stems, plant them deeply (up to the first leaves) so they won't grow to be top-heavy. Seedlings should be thinned to 24 inches apart when they're three inches tall. If you're planting seeds, set them a half inch deep, three inches apart in rows 24 to 36 inches apart. Thin them when they're big enough to lift by the true leaves and transplant the thinned seedlings.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Brussels sprouts need abundant soil moisture and cool moist air for the best growth. Cut down on watering as they approach maturity.

Special handling

If you live in an area with cold winters, pick off the top terminal bud when the plant is 15 to 20 inches tall. This encourages all of the sprouts to mature at once. Some gardeners believe that Brussels sprouts develop better'

Brussels sprout seedling

If the lower leaves are removed from the sides of the stalk as the sprouts develop. A few more leaves can be removed each week, but the top leaves should be left intact.

Pests

The cabbage family's traditional enemies are cutworms and caterpillars. Cutworms, cabbage loopers, and imported cabbage worms can all be controlled by spraying with bacillus thuringiensis, an organic product also known as Dipel or Thungicide. It's especially important to control insects on Brussels sprouts; if they insinuate themselves into the tightly curled sprouts, you'll have a lot of trouble dislodging them. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Part 1.

Diseases

Cabbage family vegetables may develop yellows, clubroot, or downy mildew. Lessen the incidence of disease by planting disease-resistant varieties when they're available, maintaining the general health of your garden, and avoiding handling the plants when they're wet. If a plant does become infected, remove and destroy it so it cannot spread disease to healthy plants. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Parti.

When and how to harvest

Time from planting to harvest is 85 to 95 days for Brussels sprouts grown from seed, 75 to 90 days from transplants. The sprouts mature from the bottom of the stem upward, so start from the bottom and remove the leaves and sprouts as the season progresses. Harvesting can continue until all the sprouts are gone. The leaves can be cooked like collards or cabbage.

Storing and preserving

If you have sprouts still on the stem in late fall, remove all the leaves from the plant, and hang the plant in a cool dry place; it will give you a late harvest. The plant can be kept up to one month in a cold, moist place. Sprouts will keep for about a week in the refrigerator. Remove loose or discolored outer leaves before you store them, but don't wash them until you're ready to use them. You can also freeze or dry sprouts. Detailed information on storing and preserving is given in Parts.

Serving suggestions

Sprouts are traditionally served with turkey at an English Christmas dinner. They're also good lightly steamed and served with a lemon-butter sauce. Don't overcook them; young sprouts should be slightly crunchy, and light cooking preserves their delicate flavor. Older sprouts have a stronger taste. Brussels sprouts can also be french fried, baked, or pureed. When you trim them for cooking, cut an X in each stem so that the sprouts cook evenly; be careful not to trim the stem ends too closely or the outer leaves will fall off when you cook them. A walnut in the pot when you cook Brussels sprouts should cut down on the cabbagey smell.

Cabbage

Common name: cabbage
Botanical name: Brassica oleracea capitata
Origin: South Europe

Varieties

Green: Stovehead (60 days); Jersey Wakefield (63 days); Golden Acre (65 days); Market Prize (73 days); Badger Ban Head (98 days); Flat Dutch (105 days). **Savoy:** Savoy Ace (80 days); Savoy King (85 days). **Red:** Red Acre (76 days); Red Ball (70 days).

Description

Cabbage, a hardy biennial grown as an annual, has an enlarged terminal bud made of crowded and expanded overlapping leaves shaped into a head. The leaves are smooth or crinkled in shades of green or purple, and the head can be round, flat, or pointed. The stem is short and stubby, although it may grow to 20 inches if the plant is left to go to seed. Cabbage is a hardy vegetable that grows well in fertile soils, and it's easy to grow in the home garden if you choose suitable varieties and follow correct pest control procedures. Like other members of the cabbage or cole family (broccoli and kale are among

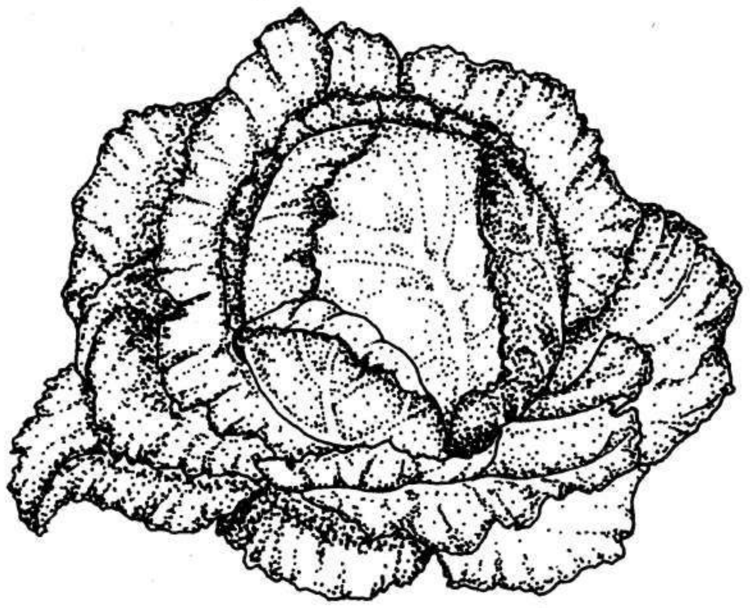
them), cabbage is a cool-weather crop that can tolerate frosl but not heat.

Cabbages have four stages of growth: (1) rapid growth of leaves; (2) formation of the head (which is the part you eat); (3) a resting period while the embryonic blossoms are being formed; and (4) development of the stalk, flowers, and seeds. The head formation stage is essential for the production of the vegetable, but not at all necessary for the survival of the plant. Cabbages thai are held in check by severe frost, lack of moisture, or too much heat will bolt, which means that they will go directly to seed without bothering to form a head at all. And even if the cabbage does make a head, if the weather gets too hot once it reaches that stage, the head can split.

Cabbages are decorative in the flower garden; purple cabbages and savoys look good in a mixed border. Flowering cabbages look like enormous variegated blossoms. In small spaces, grow cabbages as an accent in each corner of a flower bed or as a border. Decorative cabbages can be grown in containers on the patio or even indoors. Try growing a single cabbage in an eight-inch flowerpot; choose a flowering cabbage or a small early variety.

Where and when to grow

Cabbages are frost-hardy and can tolerate low20°F temperatures. They do best in a cool growing season with day temperatures under 80°F and night temperatures 20°F lower. If the plants are cold for too long a period or if the weather is warm, they will bolt without forming a head. If the head has already formed, it will split in hot weather — splitting happens when the plant takes up water so fast that the excess cannot escape through the tightly overlapped leaves, and the head bursts. The cabbage is not a suitable crop for very hot climates, although it will grow in most areas of the United States at one season or another. Time planting so that you harvest cabbage during cool weather. If your areas have cold winters, plant for summer to early fall harvest, in mild climates, plant for late spring or fall harvest. In the South, plant for harvest in late fall or winter.



Cabbage

How to plant

Cabbages like fertile, well-drained soil with a pH within the 6.5 to 7.5 range — this discourages disease and lets the plant make the most of the nutrients in the soil. When you're preparing the soil for planting, work in a complete, well-balanced , fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. If you have sandy soil or your area is subject to heavy rains, you'll probably need to supplement the nitrogen content of the soil. Use about a pound of nitrogen fertilizer for a 10-foot row. Cabbages are usually grown from transplants except where there's a long cool period, in which case you can sow seed directly in the garden in fall for winter harvest. Plant transplants that are four to six weeks old with four or five true leaves. If the transplants are leggy or have crooked stems, plant them

deeply (up to the first leaves) so they won't grow to be top-heavy. Plant the seedlings 18 to 24 inches apart in rows 24 to 36 inches apart. Plan for only a few heads at a time, or plant seeds and transplants at the same time for succession crops; you'll get the same result by planting early and midseason varieties at the same time. If you're planting seeds, set them an inch deep and space them three inches apart. Thin them to 18 to 24 inches apart when they're big enough to lift by the true leaves, and transplant the thinned seedlings.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

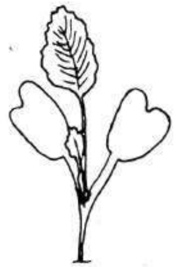
Cabbages need abundant soil moisture and cool air for best growth. Cut down the watering as the heads approach maturity to prevent splitting.

Pests

The cabbage family's traditional enemies are cutworms and caterpillars. Cutworms, cabbage loopers, and imported cabbage worms can all be controlled by spraying with bacillus thuringiensis, an organic product also known as Dipel or Thungicide. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Parti.

Diseases

Yellows virus, clubroot fungus, and black rot may attack cabbage. Cut down on the incidence of



Cabbage seedling

disease by planting disease-resistant varieties when they're available, maintaining the general health of your garden, and avoiding handling the plants when they're wet. If a plant does become infected, remove and destroy it so it cannot spread disease to healthy plants. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Parti.

When and how to harvest

Cabbages mature in 80 to 180 days from seed, depending on the variety, or in 60 to 105 days from transplants. A 10-foot row should give you five to eight heads. Start harvesting before the winter gets too warm, when the head is firm. To harvest, cut off the head, leaving the outer leaves on the stem. Often a few small heads will grow on the stalk, and you can harvest them later.

Storing and preserving

Cabbage stores well in the refrigerator for one to two weeks, and can be kept for three to four months in a cold, moist place. Cabbage can also be dried, and freezes fairly well; it can be canned as sauerkraut. Cabbage seeds can also be sprouted. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Soggy cabbage is a staple of English childhood reminiscences. Actually, steamed or boiled cabbage is an excellent dish — the secret is to cut it into small pieces before you cook it so that it cooks fast and evenly. Or try braising it in a heavy-bottomed pan with butter and just a little water; toss a few caraway seeds over it before serving. Sweet and sour red cabbage is an interesting dish. Stuffed cabbage leaves are delicious, and cabbage makes a good addition to soup — the leaves add an additional texture to a hearty, rib-sticking winter soup. The Irish traditionally serve cabbage with corned beef, and a British combination of cooked cabbage and mashed potatoes sauteed together is known as "bubble-and-squeak." French country cooks stuff a whole cabbage with sausage, then simmer it with vegetables — aversion known as *chou farci.* One way or another, there's a lot more to cabbage than coleslaw.

Cantaloupe

See Muskmelon

Cardoon

Common name: cardoon
Botanical name: Cynara cardunculus
Origin: Europe

Cardoon

Varieties

Large Smooth; Large Smooth Spanish; Ivory White Smooth. Grow any variety available in your area.

Description

Cardoon is a tender perennial grown as an annual for its young leaf-stalks, which are blanched and eaten like celery. It looks like a cross between burdock and celery but is actually a member of the artichoke family and has the same deeply cut leaves and heavy, bristled flower head. Cardoon can grow to four feet tall and two feet wide, so it will need plenty of space in your garden.

Where and when to grow

Cardoon will grow anywhere in the United States. Plant it from transplants in the spring.

How to plant

Transplants should be moved to the garden three to four weeks after the average date of last frost in your area, so if you're growing your transplants from seed you'll need to start them six weeks ahead of your planting date. Cardoon prefers full sun but can tolerate partial shade and grows quickly in any well-drained, fertile soil. When you're preparing the soil, dig in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Space the young plants 18 to 24 inches apart, with 36 to48 inches between the rows.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Part 1.

Allow the plants to dry out between waterings.

Special handling

Cardoon is usually blanched to improve the flavor and to make it more tender — the stalks can get very tough. Blanch when the plant is about three feet tall, four to six weeks before harvesting. Tie the leaves together in a bunch and wrap paper or burlap around the stems, or hill up the soil around the stem.

Pests

Aphids may be a problem. Pinch out infested foliage or hose the aphids off the cardoon plants. Control aphids chemically with Malathion or Diazinon. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Parti.

Diseases

Cardoon has no serious disease problems.

When and how to harvest

Harvest the plants four to six weeks after blanching. Cut them off at ground level and trim off the outer leaves.

Storing and preserving

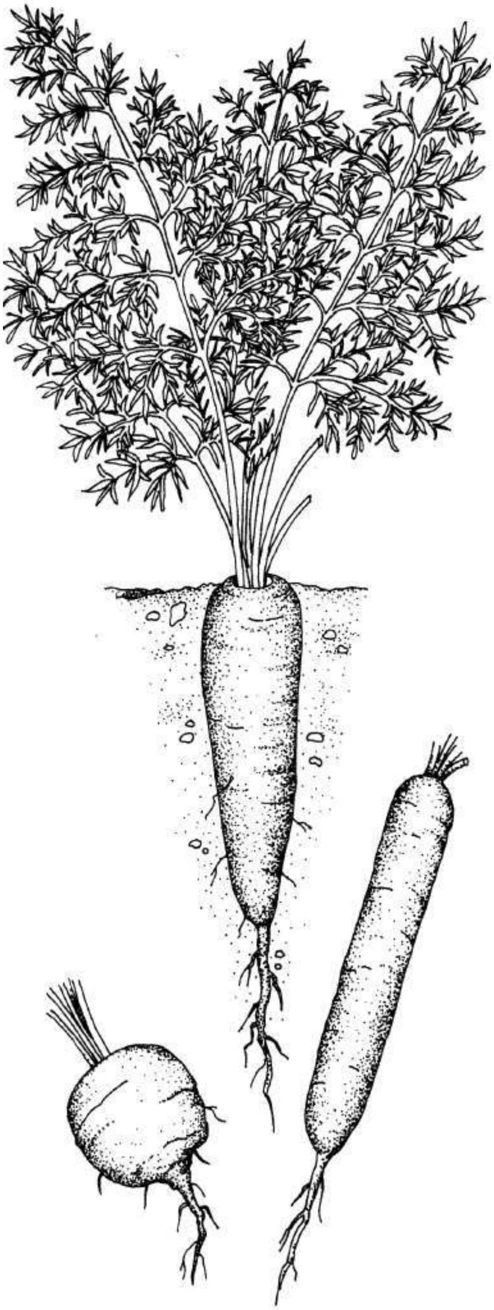
Keep stalks on root, wrap, and refrigerate; they will keep for one to two weeks. The plants can be kept for two to three months in a cold, moist place. Cardoon freezes fairly well and can be canned or dried; handle it like celery. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Cut the stalks into sections and parboil them until tender — the time will depend on the size of the stalks. Serve cardoon stalks cut into pieces and chilled with an oil and vinegar dressing, or hot with a cream sauce. Dip chunks into batter and deep-fry them. The Italians are fond of cardoon.

Carrot

Common name: carrot
Botanical name: Daucus carota
Origin: Europe, Asia



Carrot

Varieties
Short (two to four inches): Goldinhart (60-65 days); Amstel (60-65 days); Gold Nugget (60-65 days); Sweet and Short (60-65 days). **Finger** (three to four inches): Little Finger (60-65 days); Minipak (60-65 days); Tiny Sweet (60-65 days). **Half-iong** (five to six inches): Danvers Half-long (75 days); Royal Chantenay (70 days); Gold King (70 days). **Cylindrical** (six to seven inches): Nantes Coreless (68 days); Tuchon Pioneer (75 days); Royal Cross Hybrid (70 days). **Standard** (seven to nine inches): Tendersweet (75 days); Spartan Bonus *{77* days); Gold Pak (75 days); Imperator (75 days).

Description

Carrots are hardy biennials grown as annuals. They have a rosette of finely divided fernlike leaves growing from a swollen, fleshy taproot. The root, which varies in size and shape, is generally a tapered cylinder that grows up to 10 inches long in different shades of orange. Until the 20th century and the discovery of mechanical refrigeration techniques, root crops like carrots were almost the only vegetables available in the winter. They are cool-weather crops and tolerate the cold; they're easy to grow and have few pest problems, so they're good crops for the home gardener. The carrots we grow today originated in the Mediterranean. By the 13th century the Europeans were well aware of the carrot's food value. The first settlers brought them to America, and the Indians were quick to recognize their potential.

There are all sorts of carrots — long, short, fat, thin — but basically they differ only in size and shape. However, the sort of soil you have will influence which variety you choose. The shorter varieties will better tolerate heavy soil; the long types are more particular about their environment. Finger carrots can be satisfactorily grown in containers.

Carrot seedling

where and when to **grow**

Carrots are a cool-weather crop and fairly adaptable. Plant them in spring and early summer for a continuous crop, starting two to three weeks after the average date of last frost. Although carrots are tolerant of cold, the seeds take a long time to germinate, and when they're planted in cold, raw weather they may give up before they come up. Starting two to three weeks before the average date of last frost for your area, plant successive crops every two to three weeks until three months before the average date of first fall frost.

How to plant

Carrots need a cool bed. They prefer full sun but will tolerate partial shade. Before planting, work half a cup of low nitrogen (5-10-10) fertilizer into the soil, and turn the soil thoroughly to a depth of about 10 or 12 inches. This initial preparation is vital for a healthy crop; soil lumps, rocks, or other obstructions in the soil will cause the roots to split, fork, or become deformed.

Sow the seeds in rows 12 to 24 inches apart. Wide-row planting of carrots gives a good yield from a small area. When you're planting in early spring, cover the seeds with a quarter to a half inch of soil. Later, when the soil is dryer and warmer, they can be planted a little deeper. When the seedlings are growing well, thin to two to four inches apart.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

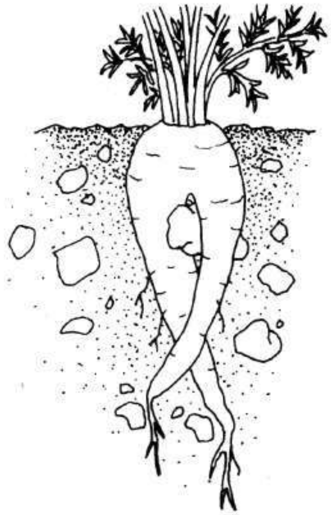
To keep carrots growing quickly, give them plenty of water. As they approach maturity, waterless — too much moisture at this stage will cause the roots to crack.

Special handling

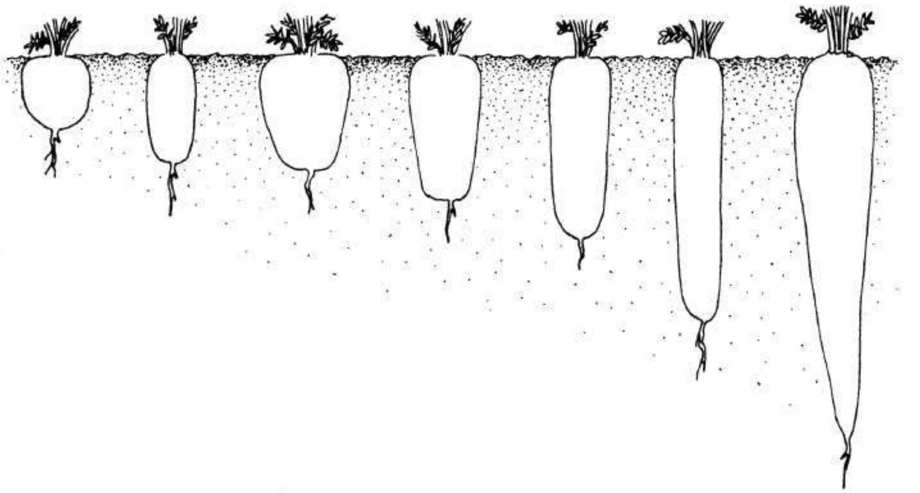
In areas with high soil temperatures, mulch to regulate the soil temperature; otherwise, the roots will grow short and pale. Carrot seedlings grow slowly while they're young, and it's important to control weeds especially during the first few weeks. Shallow cultivation is necessary to avoid damaging the roots.

Pests

Carrots have no serious pest problems. They're a good crop for the organic gardener.



Carrots need well-worked soil, free of rocks and lumps that can cause the roots to fork or split.



Grow the type of carrot best suited to your garden soil.

Diseases

Carrots have no serious disease problems.

When and how to harvest

Time from planting to harvest is from 55 to 80 days, depending on the variety. Small finger carrots are usually ready to harvest in 60 days or less; other varieties need longer. When you think they're ready, pull a few samples to check on their size. If they're three quarters inch thick or more (for regular varieties), they're ready to harvest. Pull them up by hand, or use a spading fork to lift them gently out of the ground. Pull carrots when the soil is moist — if you try to pull them from hard ground you'll break the roots.

Storing and preserving

Carrots are most obliging vegetables when it comes to preservation — most methods can be used. They'll store for one to three weeks in plastic bags or aluminum foil in the refrigerator, or for four to five months in a cold, moist place. They can also be canned, frozen, or dried. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Carrots fresh from the garden are wonderful raw. Shredded raw carrots are delicious with a touch of oil and lemon; or add raisins and fresh pineapple for an exotic flavor. Add shredded carrots to a peanut butter sandwich. Carrot cake is a staple American confection; try it with a cream cheese frosting. There are any number of ways to cook carrots; perhaps the best treatment for very young fresh carrots is simply to boil them and toss with a respectful touch of butter. You can also try them boiled, then rolled in breadcrumbs and deep-fried, or served with a marmalade glaze. Most herbs complement the taste of carrots; parsley is the most common, but try cooked carrots and peas with a touch of mint to enhance the flavor.

Cauliflower

Common name: cauliflower
Botanical name: Brassica oleracea botrytis
Origin: Europe, Mediterranean

Varieties

Super Snowball (55 days); Snowball Imperial (58 days); Snowball M (59 days); Self-Blanche (70 days); Greenball (95 days); Royal Purple (95 days).

Description

Cauliflower is a single-stalked, half-hardy, biennial member of the cole or cabbage family. It's grown as an annual, and the edible flower buds form a solid head (sometimes called a curd), which may be white, purple, or green. Cauliflower and broccoli are easy to tell apart until you meet a white-flowered broccoli or a green cauliflower. Both also come in purple, and even the U.S. Department of Agriculture can't always tell one from the other. Cauliflowers are prima donnas and need a lot of the gardener's attention. Mark Twain described a cauliflower as a cabbage with a college education.

Cauliflower has four stages of growth: (1) rapid growth of leaves; (2) formation of the head (which is the part you eat); (3) a resting period while the embryonic blossoms are being formed; and (4) development of the stalk, flowers, and seeds. The head formation stage is essential for the production of the vegetable, but not at all necessary for the survival of the plant. Cauliflower that's held in check by severe frost, lack of moisture, or too much heat will bolt, which means that it will go directly to seed without bothering to form a head at all.

Where and when to grow

Cauliflower is more restricted by climatic conditions than other cole family vegetables like cabbage or broccoli. It's less adaptable to extremes of temperature; it doesn't like cold weather, won't head properly if it's too hot, and doesn't tolerate dry conditions as well as broccoli.

Cauliflower needs two cool months in which to mature and is planted for spring and fall crops in most areas. Plant for a winter crop if your winters are mild. For a spring crop, plant transplants four to six weeks before the

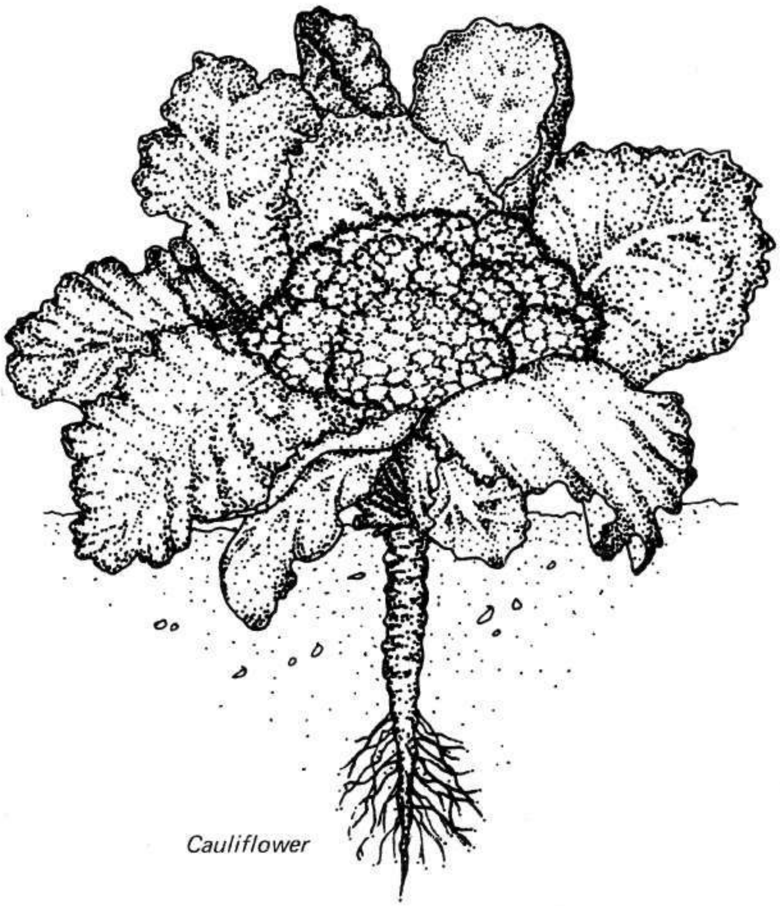
Cauliflower seedling

average date of the last frost in your area. If you're growing your own transplants from seed, start them about six weeks before your outdoor planting date.

How to plant

Cauliflower likes fertile, well-drained soil with a pH within the 6.5 to 7.5 range — this discourages disease and lets the plant make the most of the nutrients in the soil. Like other cole crops, it's usually grown from transplants except where there is a long cool period, in which case you can sow seed directly in the garden in fall for winter harvest. When you're preparing the soil for planting, work in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. If you have sandy soil or your area is subject to heavy rains, you will probably need to supplement the nitrogen content of the soil. Use about a pound of high-nitrogen fertilizer for a 10-foot row. Plant transplants that are four to six weeks old, with four or five true leaves. If the transplants are leggy or have crooked stems, plant them deeply (up to the first leaves) so they won't grow to be top-heavy.

Plant the seedlings 18 to 24 inches apart in rows 24 to 36 inches apart. Plan for only a few heads at a time, or plant seeds and transplants at the same time for succession crops; you'll get the same result by planting early and midseason varieties at the same time. If you're planting seeds, set them half an inch deep and space them three inches apart. Thin them when they're big enough to lift by the true leaves, and transplant the thinned seedlings.



Cauliflower

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

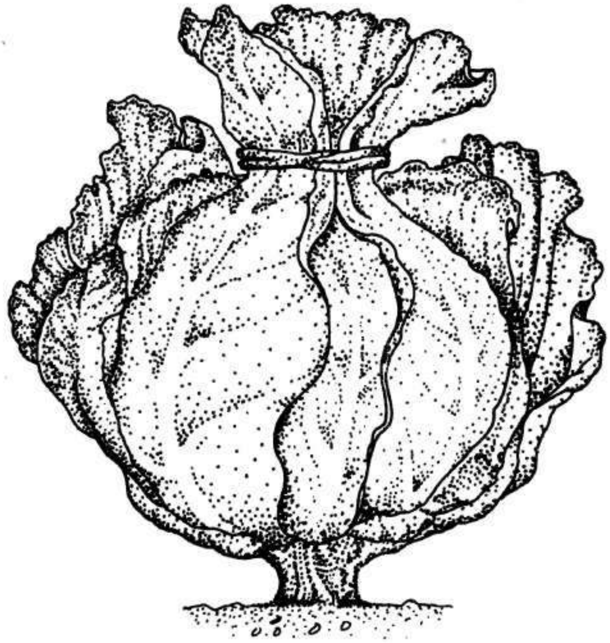
Abundant soil moisture and cool moist air are needed for the best growth; do not let the ground dry out. The plants must be kept growing vigorously; if growth is interrupted by heat, cold, damage, or lack of water, the head will not form properly.

Special handling

Cultivate cauliflower regularly to diminish weed competition and prevent a crust from forming on the soil's surface. Take care not to damage the roots.

The objective with cauliflower is to achieve a perfect head, with all the flowerets pressed tightly together. Unless it's supposed to be green or purple, the color should be untinged creamy-white, and too much sun or rain can

damage the head. To prevent this, you blanch (whiten) it. Blanch the cauliflower when it gets to be about the size of an egg, by gathering three or four leaves and tying them together over the head. If you secure the leaves with colored rubber bands you can keep track of cauliflowers tied at different times. Check the heads occasionally for pests that may be hiding inside. The self-blanching cauliflower doesn't need to be tied, but it will not blanch in hot weather. Blanching cauliflower is a cosmetic procedure; the flavor is not significantly improved, as is celery's, by blanching.



Tie outer leaves of cauliflower together to blanch, or whiten, the head.

Pests

The cabbage family's traditional enemies are cutworms and caterpillars, and cauliflower is particularly susceptible to them. However, cutworms, cabbage loopers, and imported cabbage worms can all be controlled by spraying with bacillus thuringiensis, an organic product also known as Dipel or Thungicide. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Parti.

Diseases

Cauliflower may be susceptible to root rots; the first indication of this disease is yellowing of the leaves. Cut down on the incidence of disease by planting disease-resistant varieties when they're available, maintaining the general health of your garden, and avoiding handling the plants when they're wet. If a plant does become infected, remove and destroy it so it cannot spread disease to healthy plants.

Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Part 1.

When and how to harvest

Time from planting to harvest is 55 to 100 days for cauliflower grown from transplants and 85 to 130 days for cauliflower grown from seed. Under good growing conditions the head develops rapidly to about six or eight inches in diameter. The mature head should be compact, firm, and white. Cut the whole head from the main stem. The leaves can be cooked like collards or cabbage.

Storing and preserving

Unwashed and wrapped in plastic, cauliflower can be stored for up to one week in the refrigerator, or for two to three weeks in a cold, moist place.

Cauliflower freezes satisfactorily and can also be dried or used in relishes or pickled. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Boil the whole cauliflower head just until the base yields to the touch of a fork. Add lemon juice to the boiling water to preserve the curd's whiteness. Coat the head with a light cheese sauce or simply with melted butter and parsley. Tartar sauce is an original accompaniment to cauliflower, or sprinkle it with browned breadcrumbs for a crunchy texture. The flowerets can be separated, too, and french fried. Raw cauliflower lends a distinctive flavor to salads and is good served with other raw vegetables with a mustard- or curry-flavored dip. Cauliflower pickles are good, too.

Celeriac

Common names: celeriac, turnip-rooted celery, celery root, knob celery
Botanical name: Apium graveolens rapaceum
Origin: Europe and Africa

Varieties

Alabaster (120 days); Giant Prague (120 days).

Description

Celeriac is a form of celery, a member of the same family, and similar in growing habits and requirements. Its physical characteristics and culinary uses, however, are quite different. The edible root of celeriac is large and swollen, like a turnip, and develops at soil-level; a rosette of dark green leaves sprouts from the root. The stems are hollow. The French and Germans are more accustomed than Americans to celeriac; it's commonly used In stews or eaten raw.

Where and when to grow

Celeriac does best in cool weather and especially enjoys cool nights. To grow celeriac, start in spring in the North, in late summer in the South. In the North, start from transplants; the seeds are very slow to germinate. Plant them on the average date of last frost; set the plants six to eight inches apart in rows 24 to 30 inches apart. In the South you can grow celeriac from seed. Sometimes a second crop is grown by seeding directly outdoors in spring. Plant the seeds a quarter inch deep in rows 24 to 30 inches apart, and when the seedlings are large enough to handle, thin them to six to eight inches apart.

Celeriac

How to plant

Celeriac tolerates light shade and prefers rich soil that is high in organic matter, well able to hold moisture but with good drainage. It needs constant moisture and does well in wet locations. It's a heavy feeder and needs plenty of fertilizer to keep it growing quickly. When you're preparing the soil for planting, work in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet.

If you're sowing seeds for transplants start indoors two to four months before your estimated planting date — the seeds germinate slowly. Cover the seeds with an eighth of an inch of soil, and then lay a material like burlap over the containers to keep the moisture in. Transplant carefully. To give the seedlings a good start, plant them in a trench three to four inches deep. Space the seedlings eight to 10 inches apart in rows two feet apart.

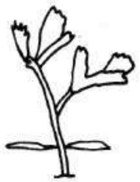
Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Part 1.

Frequent watering is important; celeriac, like celery, is shallow-rooted, and a lack of soil moisture can stop its growth. Keep the top few inches of soil moist at all times.

Special handling

Celeriac cannot compete with weeds. Cultivate conscientiously, but be careful not to disturb the



Celeriac seedling

shallow roots. As the tuber develops, snip off the side roots and hill up the soil over the swollen area for a short time to blanch the tubers. The outer surface will be whitened, but the interior will remain a brownish color.

Pests

Celeriac has no serious pest problems; it's a good vegetable for the organic gardener.

Diseases

Celeriac has no serious disease problems.

When and how to harvest

Time from planting to harvest is 110 to 120 days from seed. A 10-foot row should give you 16 to 20 roots. Pick off the lower leaves — you can use them to flavor soups and stews. Harvest celeriac when the swollen root is three to four inches wide. In warmer climates, harvest the roots when they're about the size of a baseball. Celeriac increases in flavor after the first frost, but should be harvested before the first hard freeze.

Storing and preserving

You can dry the leaves to use as an herb in soups and stews. Keep the roots in the refrigerator up to one week, or store them in a cold, moist place for two to three months. They will keep in the ground in areas where freezing weather is not a problem. You can also freeze the roots; handle them like turnips. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Peel, dice, and cook celeriac roots; then marinate them in vinegar and oil, seasoned to your taste. Or shred the raw roots, dress them with a light vinaigrette, and add them to a salad. Celeriac makes an interesting addition to any luncheon.

Celery

Common name: celery
Botanical name: Apium graveolens dulce
Origin: Europe

Varieties

Summer Pascal (115 days); Golden Plume (118 days); Utah 52-70 (125 days).

Description

Celery is a hardy biennial grown as an annual. It has a tight rosette of eight- to 18-inch stalks, topped with many divided leaves. The flowers look like coarse Queen Anne's lace and are carried on tall stalks. Celery is a more popular vegetable in this country than its cousin celeriac (which it doesn't resemble at all in looks or taste). Both are members of the parsley family, to which dill and fennel also belong, and probably originated in Mediterranean countries. Celery had been used earlier for medicinal purposes, but the French were probably the first to use it as a vegetable, somewhere around 1600. It was brought from Scotland to Michigan, where it was grown by Dutch farmers during the last half of the 19th century, and was not produced commercially in the United States until the 1870s. It's a versatile vegetable — you can eat the stalks, leaves, and seeds — but it needs a lot of attention, and it's not an easy crop for the home gardener.

Where and when to grow

Celery does best in cool weather and especially enjoys cool nights. Cold weather will inhibit growth. Grow celery in spring in the North, planting transplants two to three weeks before the average date of last frost, or in the late summer in the South. Celery seeds are very slow to germinate, so it's usually more-satisfactory to use transplants.

How to plant

Celery tolerates light shade and prefers rich soil that is high in organic matter, well able to hold moisture but with good drainage; it does well in wet, almost boggy locations. It's a heavy feeder and needs plenty of fertilizer for continuous quick growth. When you're preparing the soil for planting, work in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. If you're sowing seeds for

transplants, start them two to four months before your estimated planting date — they germinate slowly. Cover the seeds with an eighth inch of soil, and then lay a material like burlap over the containers to keep the moisture in. Transplant them in trenches three to four inches deep and two feet apart. Space the seedlings eight to 10 inches apart, and as they grow mound the soil up around them to blanch the stems. Having the plants fairly close together will also help blanching.

Fertilizing and watering

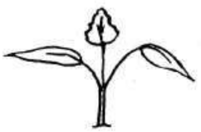
Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Make sure that the plants get plenty of water at all stages of growth. Celery is a moisture-loving plant, and lack of water may slow growth and encourage the plant to send up flower stalks — it will also get very stringy.

Special handling

Celery does not like competition from weeds during the slow early growth stage, so cultivate regularly, taking care to avoid damage to the roots, which are close to the soil surface. Unlike cauliflower, which is not much affected in flavor by blanching or whitening, celery will be bitter if it isn't blanched. Blanching is achieved by covering the plants to protect them from the sun, which encourages them to produce chlorophyll and turn green. This should be started 10 days to two weeks before harvesting.

Celery



Celery seedling

There are a number of blanching methods to choose from, but none of them should be left on more than 10 days to two weeks or the celery stalks will become pithy and rot. Soil can be mounded around each side of the celery row and built up to the tops of the stalks. Or use boards tilted to shade the celery plants. Heavy paper — freezer paper or layers of newspaper — can also be used; wrap it around each plant and fasten it with a rubber band. You can also place milk cartons with the top and bottom cut out over the plant, or gather the stalks together and fit cylinder-shaped tiles over the tops of the plants.

Pests

It's some consolation for all the work growing celery demands that the crop has no serious pest problems. This means it's a good choice for the conscientious organic gardener.

Diseases

Pink rot, black heart, and blights can all attack celery. Magnesium and calcium in the soil discourage these conditions, and with adequate fertilizing you shouldn't have a problem. If you do, check the mineral content of your soil. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Parti.

When and how to harvest

Time from planting to harvest is 100 to 130 days from transplants, about 20 days longer from seed. A10-footrowshouldyieldabout20 heads of celery. Start harvesting before the first hard frost, when the head is about two to three inches in diameter at the base. Cut off the head at or slightly below soil level.

Storing and preserving

You can refrigerate celery for up to two weeks; or if you cut the leaves to use as herbs, you can keep the leaves in the refrigerator up to one week. Celery can be dried or canned, and it freezes fairly well; or you can store it for two to three months in a cold, moist place. The leaves and seeds are used as herbs; follow the procedures given in "How To Store and Use Herbs." Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Celery is versatile. You can eat the stems, the leaves, and the seeds. The stems can be boiled, braised, fried, or baked; most people are more accustomed to celery as a raw salad vegetable or relish, but celery is great creamed or baked au gratin. And what could be more elegant than cream of celery soup? The leafy celery tops that most people throw out can be made into a refreshing drink. Boil and strain them, chill the liquid, and drink it by itself or combined with other vegetable juices.

Celery cabbage

See Chinese cabbage

Celtuce

See Lettuce

Chard

Common names: chard, Swiss chard, sea kale, Swiss beet, sea kale beet
Botanical name: Beta vulgaris cicia
Origin: Europe, Mediterranean

Varieties

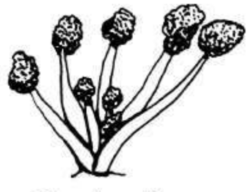
Lucullus (50 days); Fordhook Giant (60 days); Rhubarb (60 days).

Description

Chard is basically a beet without the bottom. It's a biennial that's grown as an annual for its big crinkly leaves. Chard is a decorative plant; with its juicy red or white leaf stems and rosette of large, dark green leaves, it can hold its own in the flower garden. It's also a rewarding crop for the home vegetable gardener — it's easy-going and very productive. If you harvest the leaves as they grow, the plant will go on producing all season.- Chard has an impressive history, too; it was a popular foodstuff even before the days of the Roman Empire.

Where and when to grow

Chard prefers cool temperatures; high temperatures



Chard seedling

slow down leaf production, but chard tolerates heat better than spinach does. In a mild climate you can plant chard from fall to early spring; in the North, plant from spring to midsummer.

How to plant

Plant chard from seed clusters (which each contain several seeds) about the average date of last frost in your area. Chard tolerates partial shade and likes fertile, well-worked soil with good drainage and a high organic content; like the beet, it is not fond of acid soil. Work a complete, well-balanced fertilizer into the soil before planting, at the rate of a pound per 100 square feet or 10 pounds per 1,000 square feet.

Chard

Plant the seed clusters an inch deep and four to six inches apart in rows 18 to 24 inches apart. When they're large enough to handle, thin seedlings to stand about nine to 12 inches apart. Although you are growing from seed clusters, each of which is likely to produce several seedlings, thinning is not as important as it is when you're growing beets, which must have ample room for root development. Chard plants can stand crowding — they'll produce smaller leaves but more of them. A few extra plants will also give you replacements for any that bolt or go to seed in hot weather. Remove any plants that bolt, and let the others grow.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

The crop does need enough water to keep the leaves growing quickly, so keep the soil moist at all times.

Pests

Aphids and leaf miners are the major pests you'll have to contend with. You can usually control aphids by pinching out the affected area; if there are a lot of them, try hosing them off the plants. Leaf miners, wormlike insects that feed inside the leaf surfaces, can also be controlled physically; pick off the older leaves where you see that miners have laid rows of pearl-white eggs. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Parti.

Diseases

Chard has no serious disease problems.

When and how to harvest

Time from planting to harvest is 55 to 60 days. A 10-foot row of chard should give you nine pounds or more of produce. Start harvesting chard when the outside leaves are three inches long; don't let them get much over 10 inches long or they'll taste earthy. Some gardeners like to take off the outside leaves a few at a time; others prefer to cut the entire plant down to three inches and let it grow back. Chard will grow and produce steadily all summer, and if the soil is fertile and the weather doesn't get too cold, harvesting may continue into a second year.

Storing and preserving

Chard can be stored for one to two weeks in the refrigerator. It can also be frozen, canned, or dried; use the recipes for greens. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Chard is delicious steamed or cooked like spinach. The leaves have a sweet taste like spinach, and they're colorful in a salad. Chard stalks can be cooked like celery. Cut them into pieces two or three inches long and simmer them until tender; serve them hot with butter or chilled with a light vinaigrette. If you're cooking the leaves and stalks together, give the stalks a five-minute head start so that both will be tender at the end of the cooking time.

Chayote

Common names: chayote, chocho, chuchu, sou-sou, vegetable pear, one-seeded cucumber
Botanical name: Sechium edule
Origin: Central America

Varieties

Plant whatever variety is available. You plant the whole vegetable so you can use the chayote you buy in the local Spanish *mercado.*

Description

The chayote is a tender perennial vine that grows from a tuber and can climb to 30 feet. It's a member of the gourd family, and it has hairy leaves the size and shape of maple leaves; male and female flowers are borne on the same vine. The fruit looks like a greenish or whitish flattened pear. You can eat the young shoots, the fruit, and, if the plant lives long enough, the tubers. Chayote is very popular in Mexico and Central America; it also has a place in American Creole cooking.

Where and when to grow

The chayote prefers warm to hot temperatures and cannot survive temperatures below freezing. California, Texas, and Florida have the sort of climate the chayote enjoys, but it can be grown farther north if the growing season is long. In areas where the season is short, chayote can be grown in a pot inside and then set out in the soil or kept in a pot and brought back inside when the weather turns cold.

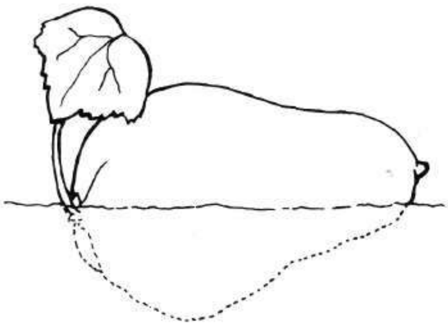
How to plant

You plant the whole fruit with the fat side placed at an angle half way down in the soil so that the stem area is level with the soil surface. Before planting, work a complete, well-balanced fertilizer into the soil at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. The chayote likes well-drained soil with a high content of organic matter and will tolerate partial shade. Space the plants 24 to 30 inches apart, with four or five feet between rows. You don't need to provide a support for the vines unless you want to save space.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Give the chayote plants plenty of water to keep them growing strongly.



Chayote seedling

Pests

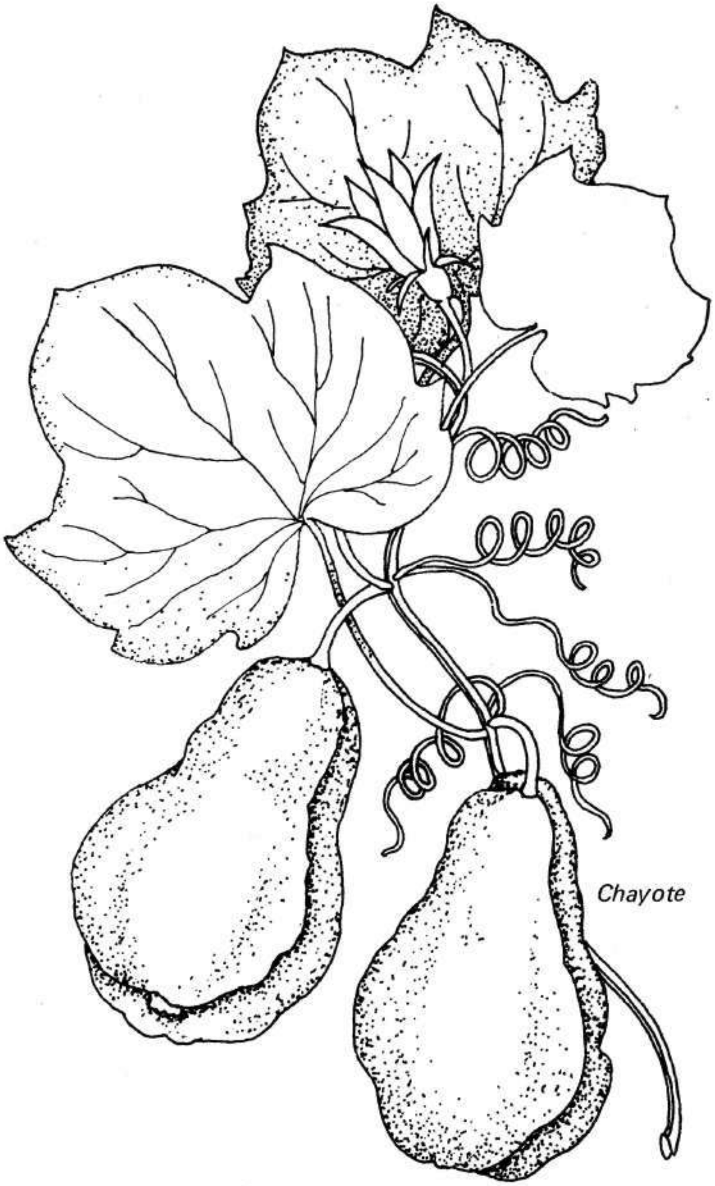
Aphids may visit your chayote vines. Hand-pick or hose them off, or control them chemically by spraying with Malathion or Diazinon. Detailed information on pest control is given In "Keeping Your Garden Healthy" in Parti.

Diseases

Chayote has no serious disease problems.

When and how to harvest

Time from planting to harvest is 120 to 150 days. Cut the chayote off the vine while the fruit is young and tender; don't wait until the flesh gets hard.



Chayote

Storing and preserving

Chayotes will keep in the refrigerator up to one week. Freeze your extra chayotes either diced or stuffed like squash. Detailed information on storing and preserving is given In Part 3.

Serving suggestions

Chayote can be prepared any way you prepare squash. Chayote Is best eaten young and tender. If It overripens, scoop out the flesh, remove the seed (a large seed, in what looks like a terry cloth bag), mash the flesh with cheese or meat, restuff the empty shell and bake. The tubers of very mature plants are edible and filling, but not very flavorful.

Chick pea

Common names: chick pea, gram, garbanzo
Botanical name: Cicerarietinum
Origin: southern Europe and India

Varieties
Few varieties are available; grow the variety available in your area.

Description

Chick peas or garbanzos are regarded as beans, but their botanical place is somewhere between the bean and the pea. They're tender annuals and grow on a bushy plant, rather like

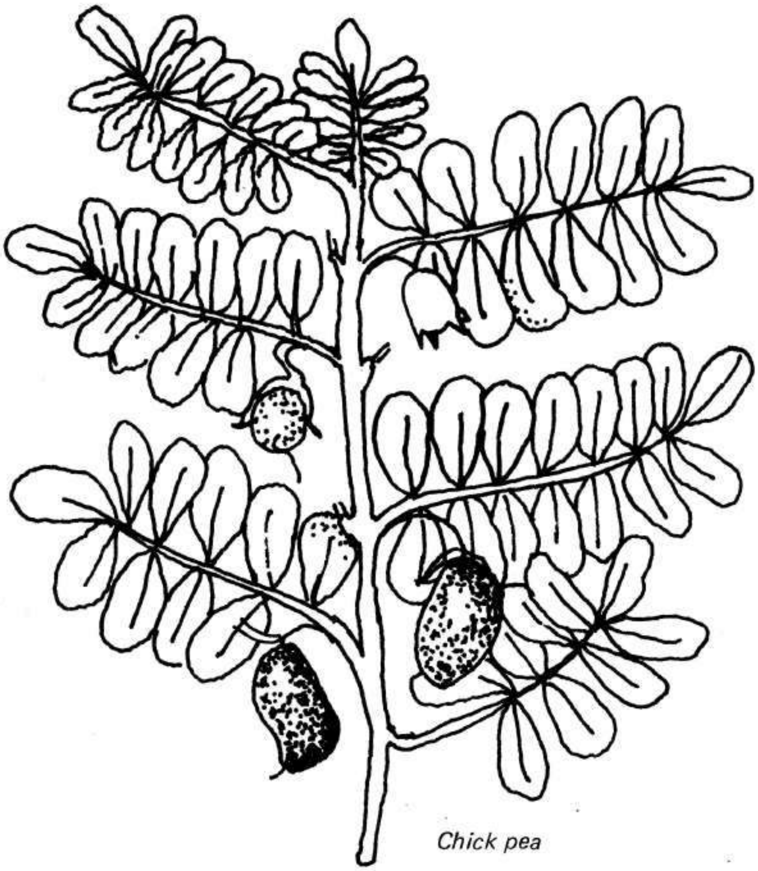
snap beans but they have a longer growing season. Chick peas have puffy little pods that contain one or two seeds each. In some areas they're grown as a field crop as a food for horses, but they're good food for people, too.

Where and when to grow

Chick peas are tender plants and can't tolerate much cold — a hard frost will damage the immature beans. You can grow them anywhere in the United States that has 90 to 100 frost-free days. Plant chick peas from seed on the average date of last frost for your area.

How to plant

Choose a bed in full sunlight; chick peas tolerate partial shade, but partial shade tends to mean a partial yield. Prepare the soil by mixing in a pound of 5-10-10 fertilizer — don't use a high-nitrogen fertilizer, because too much nitrogen will promote growth of foliage but not of the pods. Work the fertilizer into the soil at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. The seeds may crack and germinate poorly when the moisture content of the soil is too high. Don't soak the seeds before planting, and don't overwater immediately afterward. Plant seeds an inch deep and two inches apart in rows at least 18 to 24 inches apart. When the seedlings are growing well, thin the plants to four to six inches apart. Cut the seedlings with scissors at ground level; be careful not to disturb the others.


Chick pea

They don't mind being a little crowded; in fact, they'll use each other for support.

Fertilizing and watering

Chick peas set up a mutual exchange with soil microorganisms called nitrogen-fixing bacteria, which help them produce their own fertilizer. Some gardeners recommend that if you haven't grown beans in the plot the previous season, you should treat the seeds before planting with a nitrogen-fixing bacteria inoculant to help them convert organic nitrogen compounds into usable organic compounds. This is a perfectly acceptable practice but it isn't really necessary; the bacteria in the soil will multiply quickly enough once they've got a growing plant to work with.

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Keep the soil moist until the chick peas have pushed through the ground. Water regularly if there's no rain, but remember that water on the flowers can cause the flowers and small pods to fall off. When the soil temperature reaches 60°F you can mulch to conserve moisture.

Special handling

Don't bother the plants when they're wet or covered with heavy dew; handling or brushing against them when they're wet spreads fungus spores. Cultivate thoroughly but with care, so that you don't disturb the bean plants' shallow root systems.

Pests

Chick peas may be attacked by aphids, bean beetles, flea beetles, leafhoppers, and mites. Aphids, leafhoppers, and mites can be controlled chemically by spraying with Malathion or Diazinon. Bean beetles and flea beetles can be controlled chemically by spraying with carbaryl. Chick peas are almost always attacked by large numbers of pests that cannot be controlled by organic methods. This doesn't mean the organic gardener can't grow them, but yields may be lower if only organic controls are used. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Parti.

Diseases

Chick peas are susceptible to blight, mosaic, and anthracnose. You can cut down on the incidence of disease by planting disease-resistant varieties when they're available, maintaining the general health of your garden, and avoiding handling the plants when they're wet. If a plant does become infected, remove and destroy it so it cannot spread disease to healthy plants. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Parti.

When and how to harvest

If you want to eat them raw, pick chick peas in the green shell or immature stage. For drying, harvest the chick peas when the plants have matured and the leaves have turned completely brown. At this time the seeds should be dry and hard — bite a couple of seeds; if you can hardly dent them they're properly dry and ready to harvest.

Storing and preserving

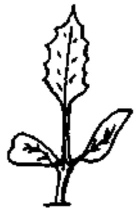
Unshelled chick peas can be kept up to one week in the refrigerator. You can freeze, can, or dry the shelled chick peas, and they can also be sprouted. Dried shelled chick peas can be stored in a cool, dry place for 10 to 12 months. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Shelled chick peas can be steamed or boiled like peas, or roasted like peanuts. Vegetarian cooks often use chick peas with grains as a protein-rich meat substitute. In the Middle East they're pureed with garlic, lemon juice, and spices.

Chicory

Common names: chicory, witloof, French endive, Belgian endive, succory
Botanical name: Cichorium intybus
Origin: Asia, Europe



Chicory seedling

Varieties

For chicory root: Brunswick; Magdeburg; Zealand. For Belgian endive: Witloof.

Description

Chicory is a hardy perennial with a long, fleshy taproot and a flower stalk that rises from a rosette of leaves. It looks much like a dandelion except that the flowers grow on a branched stalk and are pale blue.

Chicory is grown either for its root, which can be roasted to produce a coffee substitute, or for its tender leaf shoots, which are known as Belgian or blanched endive. This plant is not to be confused with endive or escarole, which are grown as salad greens. Both chicory and endive belong to the same family, and the names are often used interchangeably, but they aren't the same plant. If you want to produce the chicory root or the Belgian endive, you grow chicory *(Cichorium intybus)* — you can eat the leaves, but that's not why you're growing the variety. If you're growing specifically for greens, you grow endive (*Cichorium endivia*).

Chicory has two stages of development. The first produces the harvestable root. In the

second stage, you harvest the root and bury it upright in damp sand or soil until it produces sprouts or heads of pale, blanched leaves; these heads are the Belgian endives. Once you've harvested the heads, you can still use the roots, although they won't be as satisfactory as roots grown specifically for their own sake.

Where and when to grow

Chicory is very hardy, tolerates cold, and can be grown for Its roots anywhere in the United States. Since the second stage that produces the heads takes place after harvesting, climate is not an issue. Plant chicory seeds in the garden two to three weeks before the average date of last frost for your area.

How to plant

Chicory tolerates partial shade. The soil should be well-drained, high in organic matter, and free of lumps that might cause the roots to fork or split. Work a complete, well-balanced fertilizer into the soil before planting, at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Plant the seeds an inch deep in rows 24 to 36 inches apart, and thin them to 12 to 18 inches apart when the seedlings are four inches tall. You can eat the thinnings.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed Information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Keep the plants evenly moist.

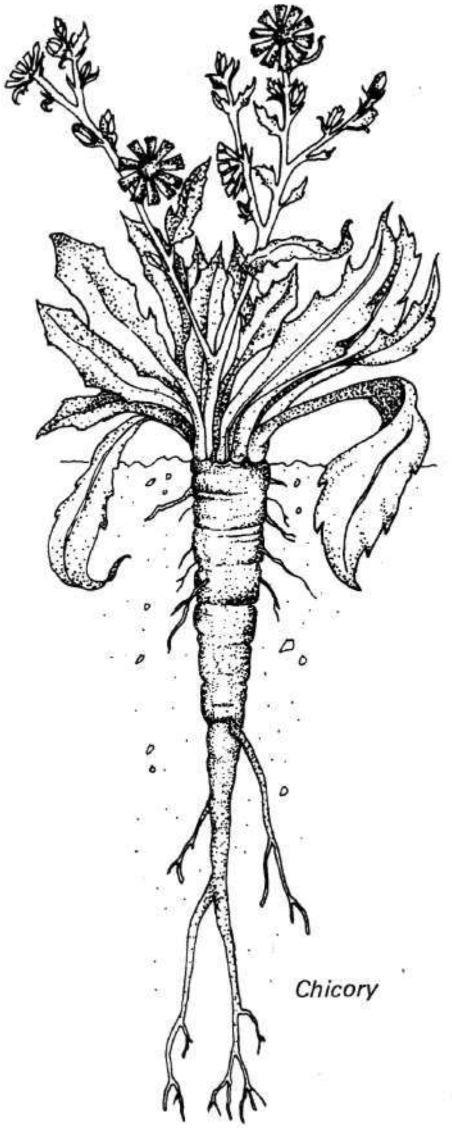
Special handling

If chicory is planted in well-cultivated soil that's rich in organic matter, it should develop large roots. If you're growing the plants for the roots alone, they'll be ready to harvest about 120 days after planting. If you want to produce the blanched heads, follow this procedure. Before the ground freezes, dig up the chicory roots and cut off the tops about two inches above the crown or top of the root. Store the roots in a cool, humid place — an outdoor pit or a root cellar. In winter and spring, bury the roots to "force" them and produce the blanched sprouts — for a continuous supply repeat the procedure every few weeks.

To prepare the roots for forcing, cut off the tips so that the roots are six to eight inches long, and pack them upright in a box, pot, or other container filled with fine sand or a mixture of sand and peat moss. Cover the tops of the roots with seven or eight inches of sand or sawdust, water thoroughly, and keep at a temperature of 60° to 70°F. Put them in your basement or in a cold frame or trench in the garden. You may need to water occasionally during the three or four weeks the heads take to develop. When the heads break the surface, remove the potting material and cut the heads with a knife where they meet the root.

Pests

Chicory has no serious pest problems. It's a good crop for the organic gardener who doesn't mind doing the extra work that chicory requires in its second stage of growth.



Diseases

Chicory has no serious disease problems.

When and how to harvest

It takes more than 100 days to produce a mature chicory root. For the traditional blanched endive, you'll have to wait three or four

weeks after starting the forcing procedure. You should be able to get 30 to 50 blanched heads from a 10-foot row of chicory plants.

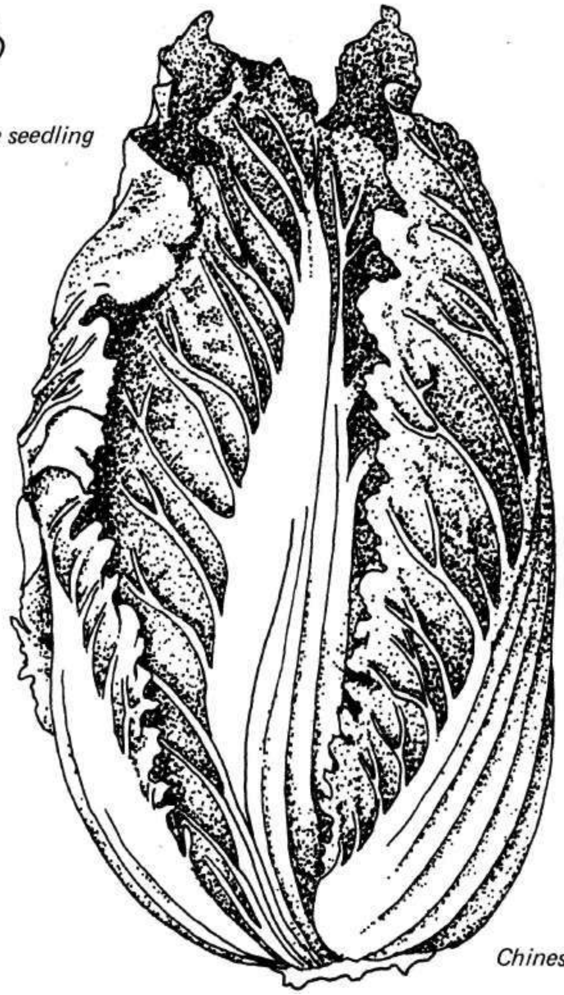
Storing and preserving

Refrigerate the cut heads until you're ready to serve them, up to one week. You can keep the entire plant — root and all — for two to three months in a cold, moist place, or you can dig up the roots and store them for 10 to 12 months. Detailed information on storing is given in Part 3.

Serving suggestions

The roots of chicory are sometimes roasted and ground to add to coffee or used as a coffee substitute. Wash and dice the root, then dry it and roast it before grinding. Blanched endive heads are good braised or in salads. Mix endive with peppers, artichoke hearts, and sardines for an Italian-style salad, or with olives, cucumbers, anchovies, and tomato wedges in the Greek manner.

Chinese cabbage seedling



Chinese cabbage

Chinese cabbage

Common names: Chinese cabbage, white cabbage, flowering cabbage, celery cabbage, pakchoy, Michihii, Napa cabbage
Botanical name: Brassica chinensis
Origin: China

Varieties

Burpee Hybrid (75 days); Crispy Choy (pakchoy type, 53 days); Michihii (heading type, 72 days).

Description

Chinese cabbage is a hardy biennial grown as an annual, and it's not a member of the cabbage family. It has broad, thick, tender leaves; heavy midribs; and can be either loosely or tightly headed and grow 15 to 18 inches tall. The variety with a large compact heart is called celery cabbage, pakchoy, or Michihii. In Chinese, call *\tpe-tsai;* in Japanese, say *hakusai.* Despite the name, the appearance and taste of Chinese cabbage are closer to lettuce than to regular cabbage.

Where and when to grow

Chinese cabbage can be grown only in cool weather, because it bolts (goes to seed) quickly in hot weather and long days — it bolts much faster than the cabbage family vegetables. It's usually grown as a fall crop in the North and as a winter crop in the South. It can be started inside and transplanted outside in the spring, but Chinese cabbage

shocks easily, and transplanting sometimes shocks it into going to seed.

How to plant

Chinese cabbage is difficult to grow in the home garden unless you can give it a long, cool growing season. Plant it four to six weeks before your average date of last frost. Even if the first fall frost arrives before the head forms you'll still get a crop of greens. Chinese cabbage will tolerate partial shade. The soil should be well-worked and well-fertilized, high in organic matter and able to hold moisture. When you're preparing the soil for planting, work in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Sow seeds in rows 18 to 30 inches apart, and when the seedlings are large enough to handle, thin them to stand eight to 12 inches apart. Don't even attempt to transplant Chinese cabbage unless you've started the seeds in peat pots or other plantable containers.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Water frequently to help the young plants grow fast and become tender. They'll probably go to seed if their growth slows down.

Pests

Flea beetles, aphids, and cabbage worms make Chinese cabbage difficult to grow without spraying. Aphids can be partially controlled without chemicals by hand-picking or hosing, and cabbage worms can be controlled by spraying with bacillus thuringiensis, which is an organic product. Flea beetles usually must be chemically controlled with carbaryl, which will also control cabbage loopers. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Parti.

Diseases

Yellows virus, clubroot, and black rot may attack Chinese cabbage. Cut down on the incidence of disease by planting disease-resistant varieties when they're available, maintaining the general health of your garden, and avoiding handling the plants when they're wet. If a plant does become infected, remove and destroy it so it cannot spread disease to healthy plants. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Parti.

When and how to harvest

Time from planting to harvest is 50 to 80 days, and a 10-foot row should give you 10 or more heads. Harvest when the heads are compact and firm and before the seedstalks form. With a fall crop, harvest before hard-freezing weather. To harvest, cut off the whole plant at ground level.

Storing and preserving

Chinese cabbage stays fresh in the refrigerator up to one week, or in a cold, moist place for two to three months. You can also freeze or dry it, and the seeds of Chinese cabbage can be sprouted. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Chinese cabbage has a very delicate, mild flavor, more reminiscent of lettuce than of cabbage. It makes an interesting slaw, with a sour cream dressing and a little chopped pineapple. Or serve it in wedges like cabbage. Of course, the ideal use is in Chinese stir-fry dishes and soups. Try shredding the Chinese cabbage with a bit of carrot, flavoring it with ginger and soy sauce, and dropping it in spoonfuls into oil in the wok. It's crunchy and delicious. You can also butter-steam Chinese cabbage as an accompaniment to roast pork, or use the leaves to make cabbage rolls.

Collards

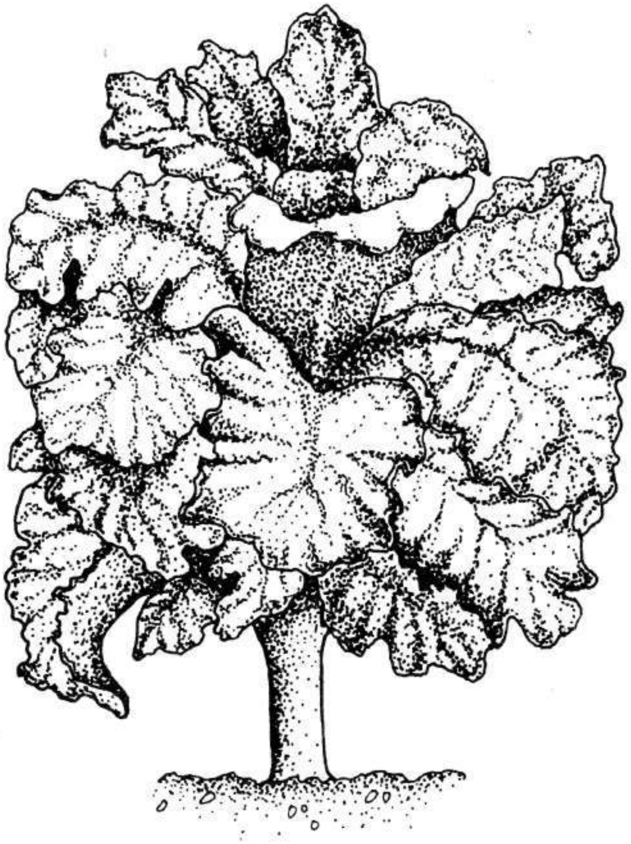
Common name: collards
Botanical name: Brassica oleracea acephalo
Origin: Europe

Varieties

Georgia (75 days); Vates (75 days).

Description

A hardy biennial grown as an annual, the collard grows two to four feet tall and has tufts or rosettes of leaves growing on sturdy stems. Collard is a kind of



Collard

kale, a primitive member of the cabbage family that does not form a head. The name collard is also given to young cabbage plants that are harvested before they have headed. Collards were England's main winter vegetable for centuries.

Where and when to grow

Like other members of the cole or cabbage family, collards are hardy and can tolerate low20°F temperatures. They're also more tolerant of heat than some cole crops; they can take more heat than cabbage and more cold than cauliflower. In the South, get ahead of the warm weather by planting collards in February or March. In the North, you can get two crops by planting in early spring and again in July or August.

How to plant

Collards like fertile, well-drained soil with a pH within the 6.5 to 7.5 range — this discourages disease and lets the plant make the most of the nutrients in the soil. Collards are usually grown from transplants planted four to six weeks before the average date of last frost, except where there is a long cool period; in this case you can sow seed directly in the garden in fall for a winter harvest.

When you're preparing the soil for planting, work in a complete well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. If you have sandy soil or your area is subject to heavy rains, you'll probably need to supplement the nitrogen content of the soil. Use about a pound of nitrogen fertilizer for a 10-foot row.

If you're planting seeds, set them an inch deep and space them three inches apart. Thin them when they're big enough to lift by the true leaves. You can transplant the thinned seedlings. If you're planting transplants, they should be four to six weeks old with four or five true leaves. If the transplants are leggy or have crooked stems, plant them deeply (up to the first leaves) so that they won't grow to be top heavy. Plant the seedlings 12 inches apart in rows 18 to 24 inches apart.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Part 1.

Water them regularly to keep the leaves from getting tough.

Special handling

If collard plants get too heavy you may need to stake them.

Pests

The cabbage family's traditional enemies are cutworms and

caterpillars. Cutworms, cabbage loopers, and imported cabbage worms can all be controlled by spraying with bacillus thuringiensis, an organic product also known as Dipel or Thungicide. Generally, collards have fewer pest problems than other cole crops. They are one of the best and most prolific crops for the organic gardener. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Parti.

Diseases

Collards have no serious disease problems.

When and how to harvest

Time from planting to harvest is 75 to 85 days from transplants, 85 to 95 days from seed. A 10-foot row should yield eight pounds or more of collard greens. Collards become sweeter if harvested after a frost, but you should harvest them before a hard freeze. In warmer areas, harvest the leaves from the bottom up before they get old and tough.

Storing and preserving

Collards can be stored in the refrigerator up to one week, or in a cold, moist place for two to three weeks. Collards can be frozen, canned, or dried; use the recipes for greens. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Collards can be steamed or boiled; serve them alone or combine them with ham or salt pork. Corn bread is a nice accompaniment.

Corn

Common names: corn, sweet corn
Botanical name: Zea mays
Origin: Central America

Varieties

A large number of varieties are available. Your local extension service can give you suggestions for the best corn to grow in your area. These are just a few of the good varieties available: Polar Vee (55 days); Sugar and Gold (white and yellow kernels, 60 days); Earliking (66 days); Butter and Sugar (white and yellow kernels, 78 days); Golden Cross Bantam (84 days). For late crops, try Aristogold Bantam Evergreen (90 days) or Silver Queen (92 days).

Description

Corn, a tender annual that can grow four to 12 feet tall, is a member of the grass family. It produces one to two ears on a stalk, of which only one may be harvestable. The pollen from the tassels must fall into the cornsilk to produce kernels, and if pollination does not occur, all that will grow is the cob. The kernels of sweet corn can be yellow, white, black, red, or a combination of colors. Corn is the No. 1 crop in the United States and (with rice, wheat, and potatoes) one of the top four crops in the world. But despite the popularity of sweet corn and popcorn, most corn is eaten secondhand — 80 percent of the United States corn crop goes into the production of meat. Corn is not the easiest crop to grow in

Corn

Corn seedling

your home vegetable garden, and it doesn't give you a lot of return

for the space it occupies. Don't be taken in by all that lush foliage — you will generally get only one harvestable ear of corn from a stalk, although some dwarf varieties will produce two or three.

Where and when to grow

You can grow corn in any area, but the time it will take to reach maturity depends on the amount of heat it gets; corn doesn't really get into its stride until the weather warms up. You may get two crops, depending on which variety you plant.

How to plant

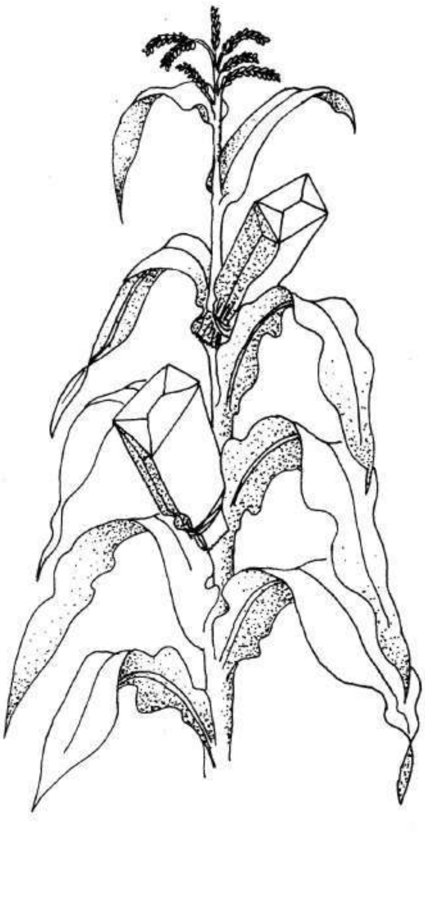
Corn likes well-worked, fertile soil with good drainage, and it must have full sun. Fertilize the soil before planting, using a third of a pound of a complete, well-balanced fertilizer on each side of a 10-foot row. Place the fertilizer an inch below and two inches away from where you plan to put the seed.

Plant corn when the soil temperature reaches 60°F. Plant the seeds two to four inches apart, in rows (short rows in a block, rather than one long row) or inverted hills. Planting In clumps or blocks ensures pollination. For a continuous supply, plant a dozen seeds of the same variety every two weeks (or when the previous planting shows three leaves), or plant early, midseason, and late varieties at the same time. When the corn is about six inches tall, thin short varieties to two feet apart, tall varieties to three feet apart. Corn can be grown closer together than this, but then the roots are more crowded and more watering and feeding are needed.

Fertilizing and watering

Corn is a heavy user of nitrogen. Fertilize in spring, again when the corn is eight inches tall, and again when it's 18 inches tall. Side-dress between the rows, using a third pound of complete, well-balanced fertilizer on each side of a 10-foot row. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Watering is very important. Keep the soil evenly moist. Corn often grows so fast in hot weather that the leaves wilt because the roots can't keep the leaves supplied with moisture. Although corn requires so much water, rain or water on the tassels at the time of pollination can reduce the number of kernels on a cob — and sometimes can destroy the whole crop. When watering corn, try to avoid getting water on the tassels.



Protect corn from birds by tying paper bags over the ears.

Special handling

Keep the competition down. Weed early and keep the weeds cut back, but remember that corn has very shallow roots; a vigorous attack on the weeds may destroy the corn. Be sure to thin extra corn plants — crowding stimulates lots of silage, but no cobs. Protect the ears with paper bags after pollination if you're having trouble with birds.

Pests

Corn is attacked by many pests — notably cutworms, wireworms, flea beetles, corn earworms, and corn borers — and they usually attack In numbers too large to control by physical methods. Be prepared to use the appropriate insecticide at the first signs of insect damage. Cutworms and wireworms can be controlled with a soil drench of Diazinon. Spray flea beetles with carbaryl when they first appear. The corn earworm deposits its eggs on the developing silks of the corn, and the small caterpillars follow the silks down into the ears, where they feed on the tips.

Once they get inside the ear there is no effective control, so watch out for them and spray with carbaryl before the earworms get inside the protective cover of the ear. Corn borers damage stalks, ears, and tassels. They tunnel into the plant and can cause such severe damage that the stalks fall over. Watch for them, and spray with carbaryl every five days, starting when the first eggs hatch.

Raccoons and most rodents love corn and know exactly when to harvest it — usually the day before you plan to. Removing the offenders' homes and fencing in the garden are about the only ways to deter them. Because it takes up so much room and has so many pest problems, corn is not the ideal choice for either the organic gardener or the novice gardener. But for the experienced gardener with lots of room and a good spray tank, there's nothing like the taste of fresh, home-grown sweet corn. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Parti.

Diseases

Corn smut and Stewart's wilt are corn's two main disease problems. Corn smut is a fungus disease that attacks the kernels — the kernels turn gray or black and are about four times larger than normal. Destroy the affected plants, and plant your corn in a new part of the garden next time. Smut spores can survive in the soil for two years. Stewart's wilt is a bacterial disease spread by flea beetles. It causes a general yellowing of the leaves and severe stunting of the whole plant. Try to prevent It by planting resistant varieties and controlling flea beetles when they first appear. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Part 1.

When and how to harvest

From planting to harvest takes 55 to 95 days depending on the variety and, to some extent, the weather. Your harvest won't be generous — maybe five to eight ears from a 10-foot row. Harvest your corn when the kernels are soft and plump and the juice is milky. Have the water boiling when you go out to harvest and rush the corn from the stalk to the pot, then to the table. The goal is to cook the corn before the sugar in the kernels changes to starch. A delay of even 24 hours between harvesting and eating will cause both flavor and texture to deteriorate noticeably.

Storing and preserving

If you must keep corn before eating, wrap the whole thing, ear and husk, in damp paper towels; store in the refrigerator for four to eight days. Corn can be sprouted, and it also freezes, cans, and dries satisfactorily. Detailed information on storing and preserving Is given in Part 3.

Serving suggestions

After you've given your home-grown corn all that care and attention — to say nothing of a good deal of your garden space — it is almost unthinkable to do anything with It beyond boiling or steaming it quickly and annointing it with a dab of butter. You can also roast it in the husks In a hot oven or on the barbecue grill. If you have lots, make a delicate corn soup or souffle.

Cress

Common names: cress, garden cress, peppergrass
Botanical name: Lepidium sativum
Origin: Asia

Varieties

Few varieties are available commercially; grow the variety available in your area.

Description

Cress is a hardy annual with finely divided tiny green leaves that have a biting flavor. You can grow cress from seed indoors or out — it will even sprout on water-soaked cotton. It takes only 15 to 20 days from planting to harvest, which means more or less instant gratification for the least patient gardener. Children love to grow it.

Cress has a peppery flavor that gives a lift to salads. There are several kinds available, but the' curled variety is the most common.

Other types of cress are upland or winter cress (Barbarea vernapraecox) and watercress (Nasturtium officinale). Upland or winter cress (Barbarea vernapraecox) is a hardy biennial from Europe. You can sow it in the garden in early spring and harvest soon after midsummer. The plants are tough and will survive a cold winter if you mulch them.

Watercress is a trailing perennial of European origin with dark green peppery leaves and is usually grown in water. It's easily grown from seed but is usually propagated in temperate climates

from stem-pieces, which root easily in wet soil. If you're fortunate enough to have a stream running through your garden, you can try growing watercress on the bank. You can also grow it indoors in pots set in a tray of water. Watercress adds a kick to salads and makes a pretty garnish. It's full of vitamin C and minerals.

Where and when to grow

Cress grows anywhere in the United States. Garden cress, which is the one you're most likely to grow, is started from seeds

Cress

sown every two weeks starting early in spring.

How to plant

When sown outdoors, cress likes well-worked soil with good drainage. It will flourish in shade or semishade and can tolerate a wide range of temperatures. When you're preparing the soil, dig in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Sow the seeds thickly,aquarterof an inch deep in wide rows, 18 to 24 inches apart, and for a continuous crop repeat the planting every 10 to 14 days.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Part 1.

Cress needs even moisture. Try not to wet the leaves more than necessary since the soil that lodges there when water splashes on them is impossible to wash out without damaging the leaf. Cress grown indoors must have good drainage or it tends to rot.

Pests

Cress has no serious pest problems.

Diseases

Cress has no serious disease problems.

How and when to harvest

Often the plants are eaten at their very early seed-leaf stage. Cut off the cress with scissors and enjoy in salads or sandwiches.

Storing and preserving

Cress does not store well, but it can be kept in the refrigerator up to one week. The seeds can be sprouted. Detailed information on storing is given in Part 3.

Serving suggestions

The English nibble "small salads" of cress and mix the young sprouts with mustard for dainty cress sandwiches. Use it in salads or for a garnish. The peppery taste is a good foil to more bland salad greens.

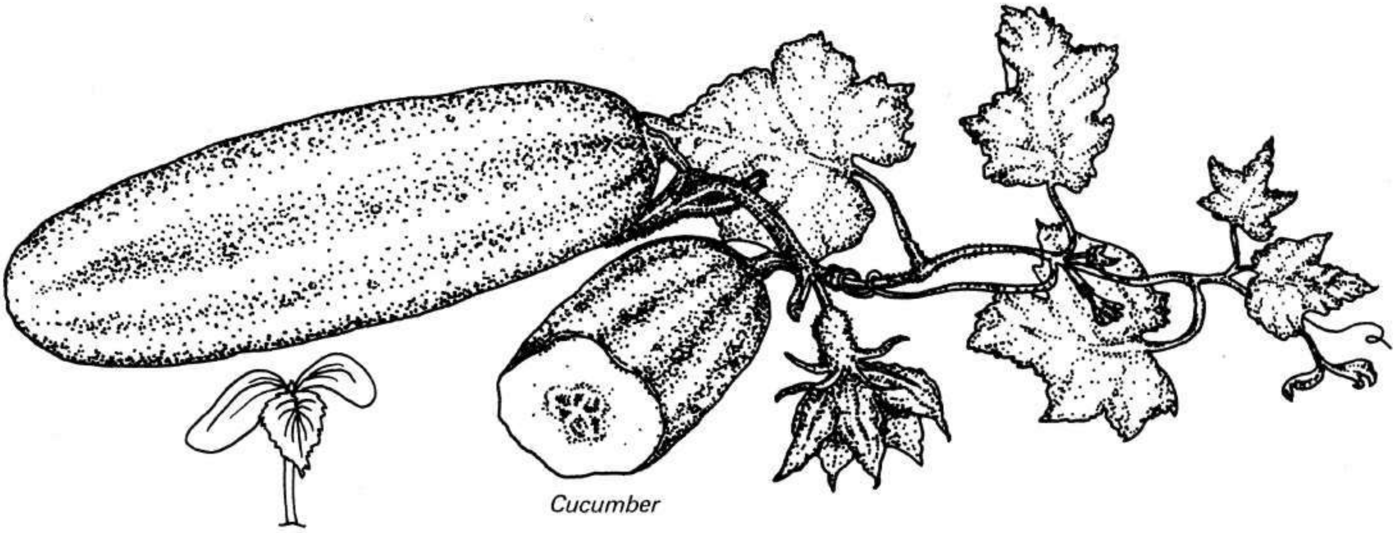
Cucumber

Common name: cucumber
Botanical name: Cucumis sativus
Origin: Asia

Varieties

There are dozens of varieties of cucumber, including "burpless" ones, which are supposed to be more digestible than regular cucumbers, and round yellow lemon cucumbers. In the United States cucumbers are divided into the slicing kind, which are large and stay green for a long time, the small stubby pickling varieties, and novelty varieties that are smaller than usual and suitable for containers or small gardens.

The following are a selection of varieties in each of these



Cucumber

Cucumber seedling

categories. Talk to your local extension service to find out about other varieties that will do well in your area. **Pickling:** Spartan Dawn Hybrid (50-60 days); SMR-18 (50-60 days), both resistant to mosaic and scab. **Slicing:** Poinsett (65 days) resistant to anthracnose, downy and powdery mildews, and leaf spot; Burpee Hybrid (60 days) resistant to downy mildew and mosaic; Challenger Hybrid (60 days), resistant to downy mildew and mosaic. **Burpless:** Sweet Slice Hybrid (65 days) resistant to downy and powdery mildews, mosaic, and scab. **Novelty:** Patio Pik Hybrid (50-55 days) pickling type, tolerant of downy and powdery mildews; Peppi Hybrid (50 days) pickling type, tolerant of downy and powdery mildews, mosaic, and scab.

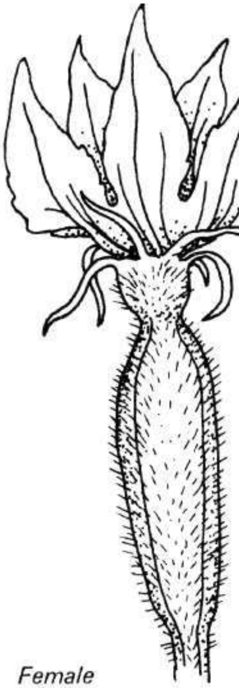
Description

Cucumbers are weak-stemmed, tender annuals that can sprawl on the ground or be trained to climb. Both the large leaves and the stems are covered with short hairs; the flowers are yellow. Some plants have both male and female flowers on the same vine, and there may be 10 males to every female flower, but only the female flowers can produce cucumbers. The expression "cool as a cucumber" has long been used to describe a person who is always calm in a crisis, and cucumbers do seem to give off a cool feeling. They're tender plants, however, and not at all tolerant to cold themselves.

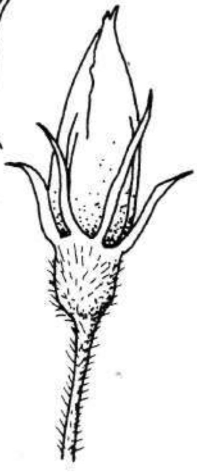
Gulliver, in the report of his voyage to Brobdingnag, told of a project for extracting sunbeams from cucumbers, sealing them in jars, and letting them out to warm the air on raw days. Long before Gulliver, the Emperor Tiberius was so fond of cucumbers that the first greenhouses — sheets of mica in window sashes — were developed to keep the plants growing on happily indoors when it was too cold to take them outside. You can grow cucumbers in a large pot or hanging basket, or train them up a fence or over an arbor.

Where and when to grow

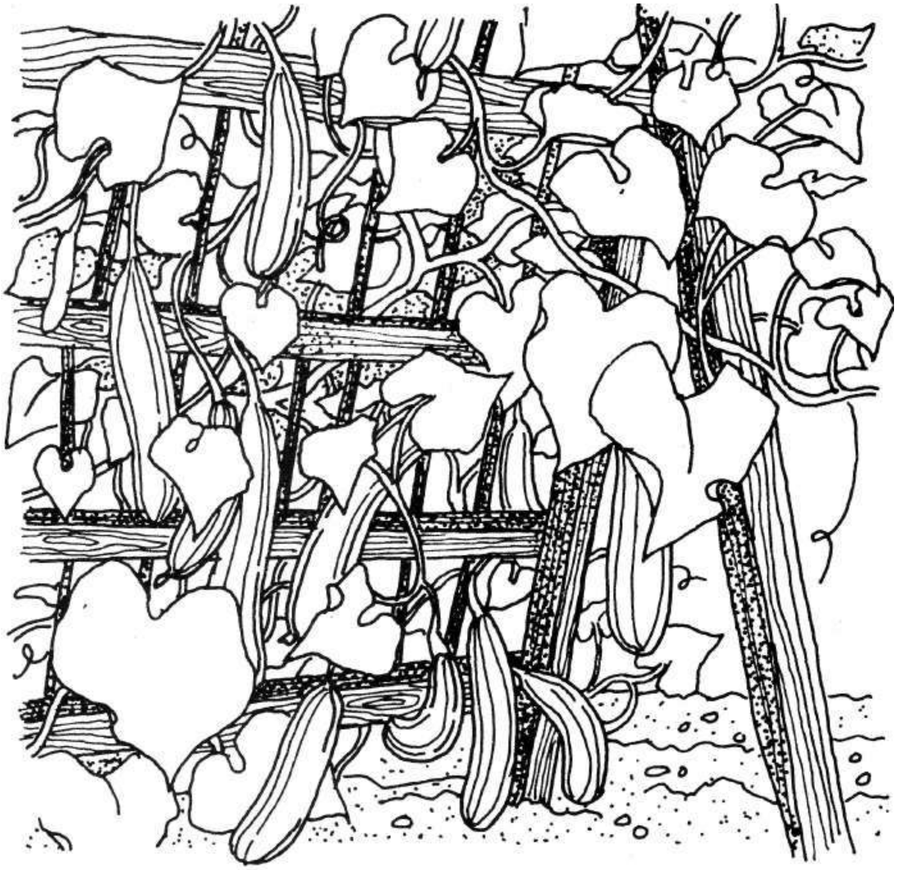
The cucumber is a warm-weather vegetable and very sensitive to frost. It will grow anywhere in the United States,



Female cucumber blossom



Male cucumber blossom



In a small garden, save space by growing cucumbers on a fence.

however, because it has a very short growing season — only 55 to 65 days from planting to harvest — and most areas can provide it with at least that much sunshine. Cucumbers like night temperatures of 60° to 65°F, and day temperatures up to 90°F. Plant them when the soil has warmed up, three to four weeks after your area's average date of last frost.

How to plant

Cucumbers will tolerate partial shade, and respond to a rich, well-worked, well-drained soil that is high in organic matter. When you're preparing the soil, dig in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Plant cucumbers in inverted hills, which you make by removing an inch or two of soil from a circle 12 inches across and using this soil to make a rim around the circle. This protects the young plants from heavy rains that might wash away the soil and leave their shallow roots exposed. Plant six or eight seeds in each hill, and when the seedlings are growing strongly, thin them, leaving the three hardiest plants standing six to 12 inches apart. Cut the thinned seedlings off with scissors at soil level to avoid disturbing the roots of the remaining plants.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Cucumbers are 95 percent water and need plenty of water to keep them growing fast. Don't let the soil dry out. In hot weather the leaves may wilt during the day, even when soil moisture is high, because the plant is using water faster than its roots can supply. This is normal; just be sure that the plant is receiving regular and sufficient water. Mulch to avoid soil compaction caused by heavy watering.

Special handling

Cultivate to keep weeds down. If you are growing cucumbers inside, or in an area where there are no insects to pollinate the female flower — your 51st floor balcony, for example — you may need to help with pollination. Take a soft-bristled brush and dust the inside of a male flower (the one without an immature fruit on the stem), then carefully dust the inside of the female flowers. Harvest promptly; mature cucumbers left on the vine suppress the production of more flowers.

Pests

Aphids and cucumber beetles are the pests you're most likely to encounter. To control aphids, pinch out infested vegetation or hose them off the cucumber vines, or spray with Malathion or Diazinon. Cucumber beetles may not do much feeding damage, but they carry cucumber

bacterial wilt. Hand-pick them off the vines promptly, or spray them with carbaryl. Cucumbers are so prolific that the organic gardener who doesn't want to use chemical controls can afford to lose a few to the bugs. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Parti.

Diseases

Cucumber plants are susceptible to scab, mosaic, and mildew. Planting disease-resistant varieties and maintaining the general cleanliness and health of your garden will help cut down the incidence of disease. If a plant does become infected, remove and destroy it before it can spread disease to healthy plants. Cucumbers are not tolerant to air pollution; a high ozone level may affect their development. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Part 1.

When and how to harvest

Time from planting to harvest is 55 to 65 days, and a 10-foot row should give you as many cucumbers as you can use. Pick the cucumbers while they're immature — the size will depend on the variety. When the seeds start to mature the vines will stop producing.

Storing and preserving

Cucumbers can be stored in the refrigerator up to one week, but if the temperature is too low they'll freeze and turn soft. You can pickle them or use them for relish if they're the right variety. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

In the Gay '90s the hallmark of an elegant tea party was cucumber sandwiches, open-faced on thin-sliced bread. In England the sandwiches are closed and cut into small squares or triangles. Slice cucumbers thinly and dress them with plain yogurt and a little dill. Don't peel them — cucumbers are mostly water anyway, and most of the vitamins they do contain are in the skin. Instead of eating them, you can make them into a refreshing face cleanser — cucumbers are an ingredient in many cosmetic products.

Dandelion

Common name: dandelion
Botanical name: Taraxacum officinale
Origin: Europe and Asia

Varieties

Thick-leaved; Improved Thick-leaved.

Description

The dandelion is a hardy perennial that's grown as an annual for its foliage and as a biennial for its roots. The jagged green leaves grow in a short rosette attached by a short stem to a long taproot. Bright yellow flowers one to two inches wide grow on smooth, hollow flower stalks. The dandelion is best known — and feared — by gardeners as a remarkably persistent lawn weed, but its leaves are actually high in vitamin A and four times higher in vitamin C than lettuce. It's also versatile: Dandelion leaves are used raw in salads or boiled like spinach, and the roots can be roasted and made into a coffeelike drink.

Where and when to grow

Dandelions grow well in any soil anywhere. They prefer full sun but will do fine in partial shade. They're very hardy and will survive both the hottest summers and the coldest winters. Plant the seeds in early spring, four to six weeks before the average date of last frost.

How to plant

Dandelions grow best in a well-drained fertile soil from which you've removed all the stones and rubble. If you're growing dandelions for their foliage only, they'll tolerate soil in poorer physical condition. When you're preparing the soil, dig in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Plant seeds in the garden a quarter inch deep in rows or wide rows 12 to 18 inches apart. Thin plants six to eight inches apart after the true leaves appear.

Fertilizing and watering

Don't bother to fertilize dandelions at midseason. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Keep the plants supplied with water; the dandelion's foliage may become even more bitter than it is naturally if it's subjected to long periods of drought.

Pests

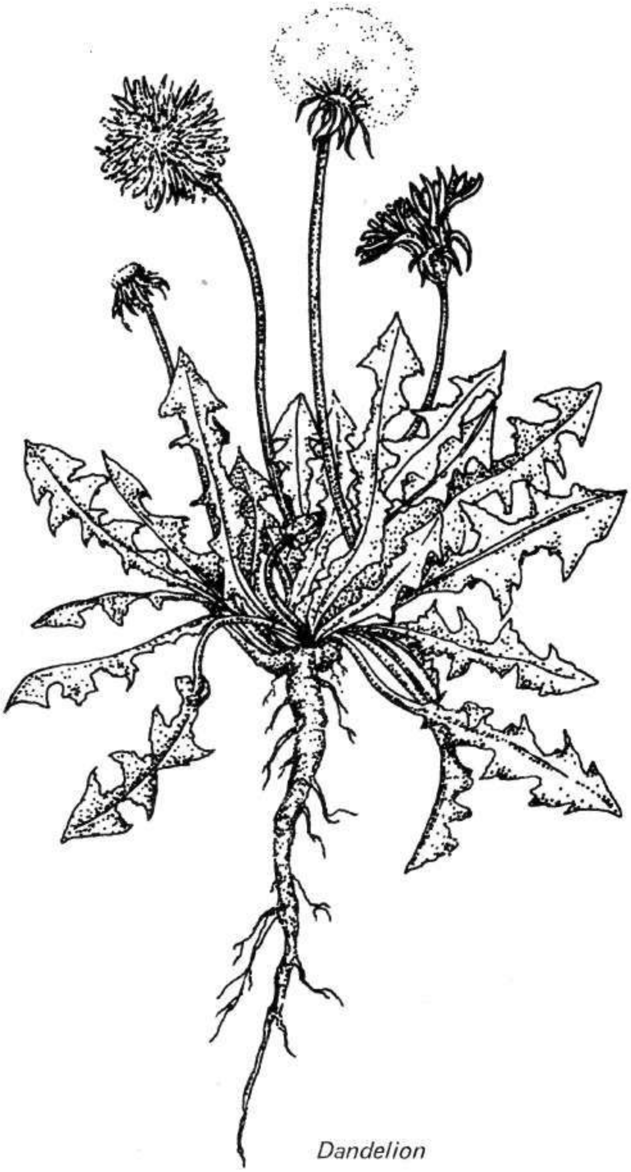
Pests don't bother dandelions. If you let the dandelions produce their delicate clocklike seed heads, however, they may well become pests themselves by seeding all over your and your neighbors' lawns.

Diseases

Dandelions have no serious disease problems.

When and how to harvest

Harvest dandelion greens at your pleasure throughout the growing season. Harvest the roots in the fall of the second year; pull the whole root from the ground — or lift the roots with a fork to avoid breaking them.



Dandelion

Storing and preserving

You can refrigerate the greens up to one week, or store the roots for 10 to 12 months in a cold, moist place, as you do with chicory. Detailed information on storing and preserving is given in Parts.

Serving suggestions

Dandelion wine is a brew much beloved of do-it-yourself vintners. Or make dandelion tea, and drink it well-chilled. Remove the stalks from the dandelions and toss the leaves in a vinaigrette dressing. Or try a hot dressing, as for a wilted spinach salad. Cook the leaves quickly and serve them with lemon and oregano, Greek-style. To use the roots, wash and dice them, then dry and roast them before grinding.

Dry bean,

See **Bean, dry**

Eggplant

Common names: eggplant, aubergine, guinea squash
Botanical name: Solanum melongena
Origin: East Indies, India

Varieties

Black Magic Hybrid (73 days); Jersey King Hybrid (75 days); Black Beauty (80 days). **Long slender fruits:** Ichlban (70 days); Slim Jim (75 days).

Description

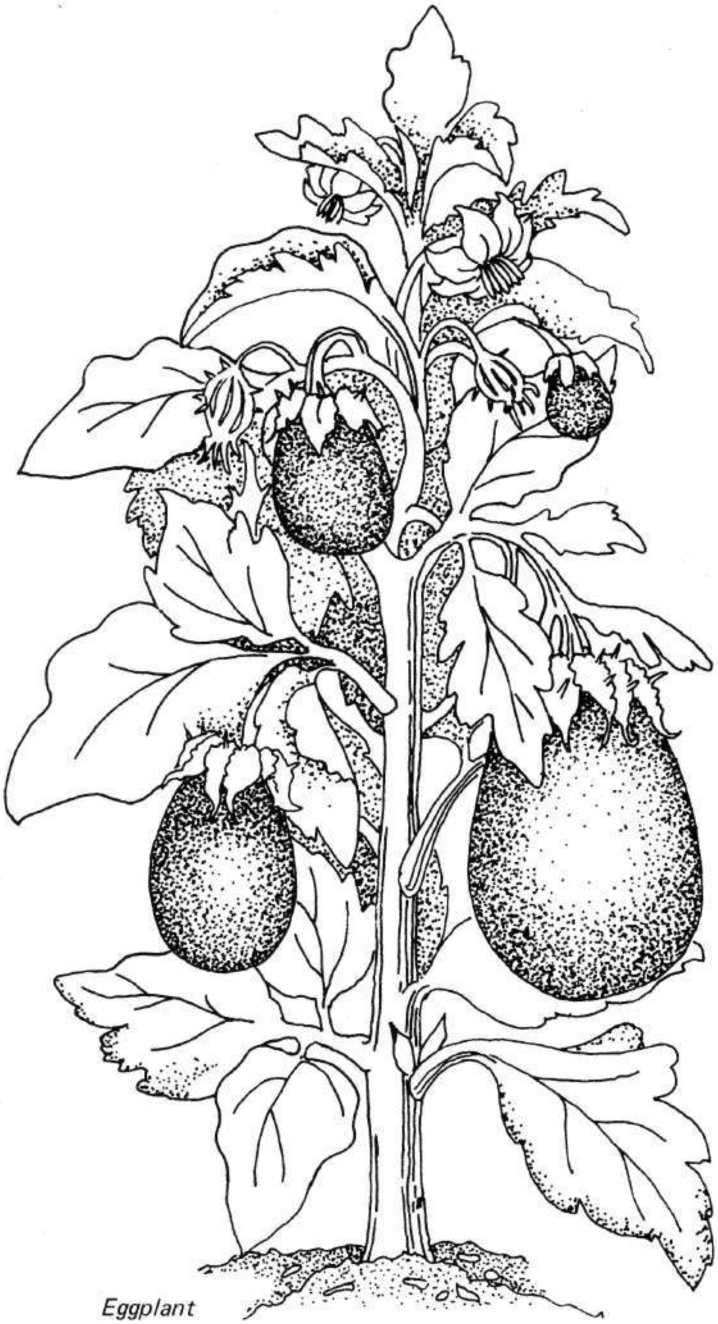
Eggplant is a very tender perennial plant with large grayish-green hairy leaves. The star-shaped flowers are lavender with yellow centers, and the long, slender or round, egg-shaped fruit is creamy-white, yellow, brown, purple, or sometimes almost black. Eggplants will grow two to six feet tall, depending on the variety. They belong to the solanaceous family, and are related to tomatoes, potatoes, and peppers, and were first cultivated in India.

Where and when to grow

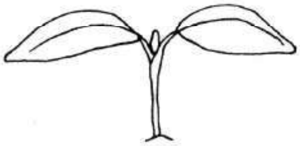
Eggplant is very sensitive to cold and needs a growing season with day temperatures between 80° and 90°F and night temperatures between 70° and 80°F. Don't plant eggplant seedlings until two to three weeks after your average date of last frost, or when daytime temperatures reach 70°F.

How to plant

You can grow eggplant from seed, but you'll wait 150 days for a harvest. It's easier to grow from transplants, started inside about two months before your outside planting date. Don't put your transplants into the garden until two or three weeks after the average date of last frost for your area — eggplants won't be rushed, and if you plant them too early they won't develop. Eggplants must have full sun. They'll grow in almost any soil, but they do better in rich soil that is high in



Eggplant



Eggplant seedling

organic matter, with excellent drainage. When you're preparing the soil, dig in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Set the plants 18 to 24 inches apart in rows 24 to 36 inches apart.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Eggplants are very fussy about temperature and moisture and must be treated with solicitude until they're well established. Try to maintain even soil moisture to ensure even growth; eggplants are susceptible to root rot if there's too much moisture in the soil.

Special handling

If you live in an area where an unpredictable late frost may occur, provide protection at night until all danger of frost is past. In hot climates the soil temperature may become too warm for the roots; in this case, mulch the plants about a month after you set them outside. Plants that are heavy with fruit may need to be staked.

Pests

Eggplants are almost always attacked by one pest or another, so they're not the ideal crop for the organic gardener. The pests you're most likely to encounter are cutworms, aphids, flea beetles, Colorado potato bugs, spider mites, and tomato hornworms. Hand-pick hornworms off the plants; control aphids and beetles by hand-picking or hosing them off the plants and pinching out infested areas. Collars set around the plants at the time you transplant them will discourage cutworms. Spider mites are difficult to control even with the proper chemicals; spray the undersides of the foliage with Diazinon before the populations get too large. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Parti.

Diseases

Fungus and bacterial diseases may attack eggplants. Planting disease-resistant varieties when possible and maintaining the general cleanliness and health of your garden will help lessen the incidence of disease. If a plant does become infected, remove it before it can spread disease to healthy plants. Protect the plants against soilborne diseases by rotating your crops and planting vegetables from a different plant family in the eggplants' spot the following season. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Part 1.

When and how to harvest

Time from planting to harvest is 100 to 150 days from seed, 70 to 85 days from transplants. Harvest the fruit young, before the flesh becomes pithy. The fruit should be firm and shiny, not streaked with brown. The eggplant fruit is on a sturdy stem that does not break easily from the plant; cut it off with a sharp knife instead of expecting it to fall into your hand.

Storing and preserving

Whole eggplant will store up to one week at 50°F; don't refrigerate it. You can also freeze or dry it. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Eggplant is very versatile and combines happily with all kinds of other foods — cheese, tomatoes, onions, and meats all lend distinction to its flavor. The French use it in a vegetable stew called *ratatouille,* with tomatoes, onions, peppers, garlic, and herbs. Ratatouille is a good hot side dish or can be served cold as a salad. Eggplant is also a key ingredient of the Greek moussaka, layered with ground meat and topped with a bechamel sauce. Or coat slices in egg and breadcrumbs and deep-fry them. To remove excess moisture from eggplant slices before you cook them, salt them liberally, let them stand about half an hour, wash them, and pat them dry. Or weight the slices with a heavy plate to squeeze out the moisture.

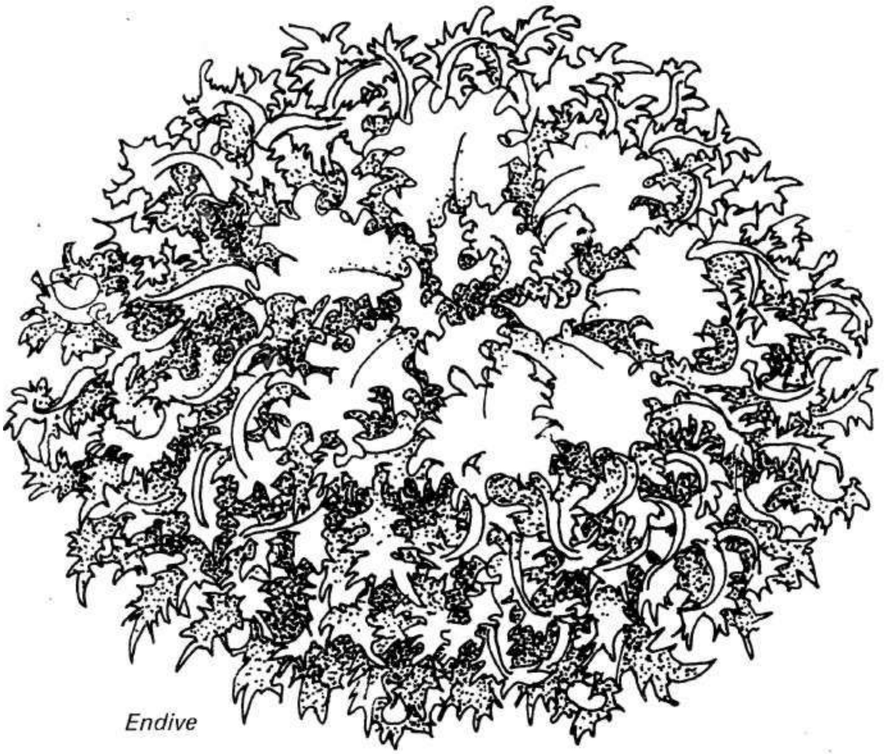
Endive

Common names: endive, escarole
Botanical name: Cichorium endivia
Origin: South Asia

Varieties

Full Heart Batavian (90 days) has

smooth leaves. Salad King (98days) has curled leaves.


Endive

Description

Endive is a half-hardy biennial grown as an annual, and it has a large rosette of toothed curled or wavy leaves that are used in salads as a substitute for lettuce. Endive is often known as escarole, and they're varieties of the same plant; escarole has broader leaves. Endive should not be confused with Belgian endive, which is the young blanched sprout of the chicory plant. Both endive and chicory, however, belong to the genus Cichorium.

Where and when to grow

Like lettuce, endive is a cool-season crop, although it's more tolerant of heat than lettuce. Grow it from seed planted in your garden four to six weeks before your average date of last frost. Long, hot summer days will force the plants to bolt and go to seed. If your area has a short, hot growing season, start endive from seed indoors and transplant it as soon as possible so that the plants will mature before the weather gets really hot. Sow succession crops, beginning in midsummer. In a mild-winter climate, you can grow spring, fall, and winter crops.

How to plant

Endive needs well-worked soil with good drainage and moisture retention. When you're preparing the soil, dig in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. If you're using transplants, start them from seed eight to 10 weeks before the average date of last frost in your area. If you're direct-seeding endive in the garden, sow seeds a quarter inch deep in wide rows 18 to 24 inches apart, and when the seedlings are large enough to handle, thin them to nine to 12 inches apart. Thinning is important because the plants may bolt if they're crowded. Plant transplants nine to 12 inches apart in rows 18 to 24 inches apart.

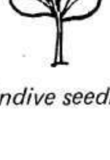
Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Water regularly to keep the plants growing quickly; lack of water will slow growth and cause the leaves to become bitter.

Special handling

Endive tastes better in salads if you blanch it to remove some of the bitter flavor. Blanching deprives the plants of sunlight and


Endive seedling

discourages the production of chlorophyll. Blanch two to three weeks before you're ready to harvest the plants. You can do this in several ways: Tie string around the leaves to hold them together; lay a board on supports over the row; or put a flowerpot over each plant. If you tie the endive plants, do it when they're dry; the inner leaves may rot if the plants are tied up while the insides are wet.

Pests

Cutworms, slugs, and snails can be troublesome. You may also have to deal with aphids. Put a collar around each plant to discourage cutworms, and trap slugs and snails with a saucer of stale beer set flush to the soil. To control aphids, pinch out infested foilage, or hose the aphids off the plants. You can also spray them with Malathion or Diazinon, taking care to spray the undersides of the leaves. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Parti.

Diseases

Endive has no serious disease problems.

When and how to harvest

Time from planting to harvest is 90 to 100 days from seed. To harvest, cut off the plant at soil level.

Storing and preserving

Like lettuce, endive can be stored for up to two weeks in the refrigerator, but you can't freeze, can, or dry it. Share your harvest with friends. Detailed information on short-term storage is given in Part 3.

Serving suggestions

Chill endive and serve it with an oil-and-vinegar dressing; add chunks of blue cheese or croutons. Mix it with other salad greens to add a distinctive flavor. The French use endive in a salad with heated slices of mild sausage, diced bacon, and croutons.

Escarole,

See Endive

Fennel

Common names: fennel, Florence fennel, finocchio, fenucchi
Botanical name: Foeniculum vulgaredulce
Origin: Mediterranean

Varieties
Few varieties are available. Crow the variety available in your area.

Description

Florence fennel or finocchio is the same as the common or sweet fennel that is grown for use as a herb. The leaves and seeds of both are used the same way for seasoning, but Florence fennel is grown primarily for its bulbous base and leaf stalks, which are used as vegetables. Florence fennel is a member of the parsley family. It's a stocky perennial grown as an annual, and looks rather like celery with very feathery leaves. The plant grows four to five feet tall and has small, golden flowers, which appear in flat-topped clusters from July to September. The whole plant has an anise flavor.

Where and when to grow

Fennel will grow anywhere in the United States. It tolerates both heat and cold, but should mature in cold weather. Grow it from seed sown two to three weeks before your average date of last frost.

How to plant

Fennel needs well-drained soil that's high in organic matter. When you're preparing the soil for planting, work in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet.

Plant the seeds a quarter of an inch deep, in rows two to three feet apart, in full sun. When the seedlings are growing strongly, thin them to stand 12 inches apart.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Keep fennel on the dry side.

Special handling

Fennel plants grow four to five feet tall; you may need to stake them if they are becoming

unwieldy. It's not often necessary, so don't bother to set stakes at the time of planting.

Pests

Since fennel is a member of the parsley family, the parsley caterpillar may appear. Remove it by hand. It has no other serious pest problems, so fennel is a good bet for the organic gardener.

Diseases

Fennel has no serious disease problems.

When and how to harvest

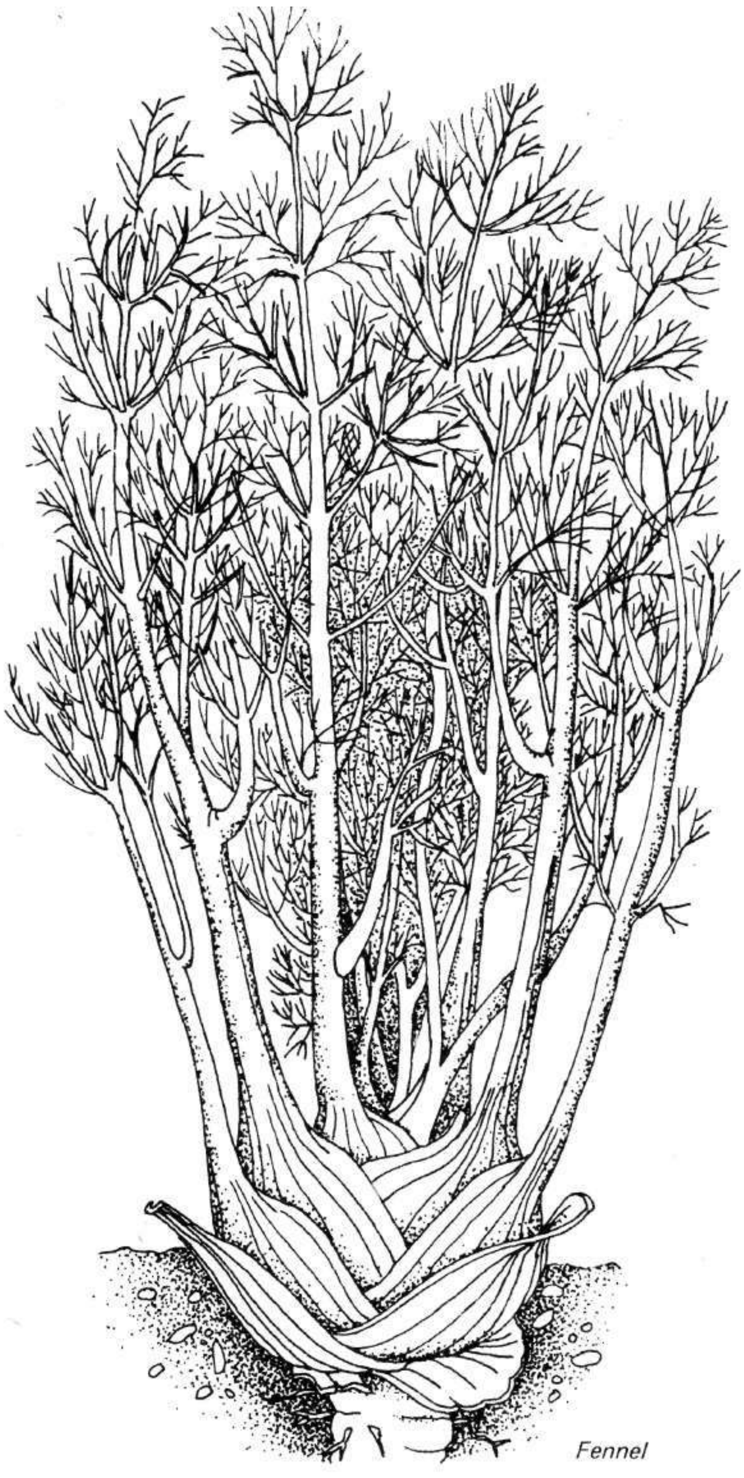
You can start harvesting a few sprigs as soon as the plant is well-established and growing steadily; use them for flavoring. Harvest the bulbous stalk when it is three inches or more in diameter; cut the whole stalk like celery, just below the point where the individual stalks join together.

Storing and preserving

Fennel leaves can be frozen or dried as herbs; crumble the dried leaves and store them in an airtight container. You'll probably want to eat the stalks fresh; store them in the refrigerator up to one week or in a cold, moist place for two to three months. The stalks can also be frozen or dried; handle them like celery.

Serving suggestions

Fennel is featured in many Italian dishes. The leaves add flavor to soups and casseroles, and fennel goes well with fish. You can prepare Florence fennel in many ways as you do celery. Cut



Fennel

the fennel stalks into slices, simmer them in water or stock until tender, and serve buttered. Bake slices of fennel with cheese and butter as an accompaniment to a roast, or eat the stalks raw as a dipping vegetable. French and Italian cooks have been using fennel for generations — hence the variety of names by which it's known. The French served grilled sea bass on a bed of flaming fennel stalks, and the dried stalks can be used for barbecuing, too.

Garbanzo,

See Chick pea

Garden pea,

See Pea

Gourd,

See Squash, winter

Green bean,

See Bean, green or snap

Greens,

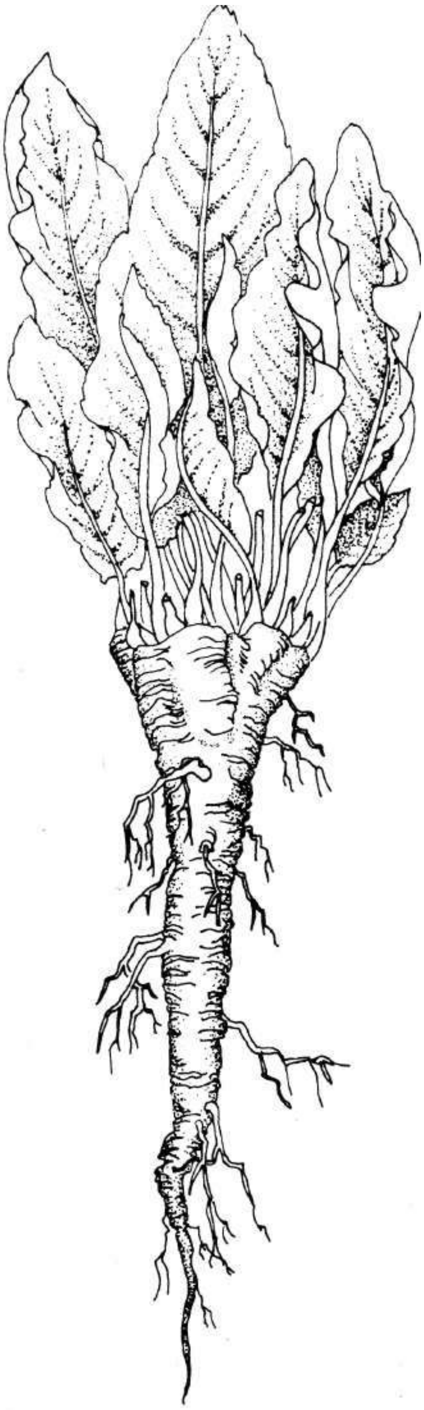
See Beet, Chard, Collard, Kale, Turnip

Honeydew melon,

See Muskmelon

Horseradish

Common name: horseradish
Botanical name: Armoracia rusticana
Origin: Eastern Europe



Horseradish

Varieties

New Bohemian.

Description

Horseradish looks like a giant, two-foot radish. In fact, it's a hardy perennial member of the cabbage family. Ninety-eight percent of all commercial horseradish is grown in three Illinois counties near St. Louis. Horseradish has a very strong flavor and — like the animal for which it's named — can deliver a powerful kick when you're not expecting it.

Where and when to grow

Horseradish is a very cold-hardy plant, which does well in the North and in cool, high-altitude areas in the South. Grow it from crowns or roots planted four to six weeks before the average date of last frost for your area.

How to plant

Horseradish tolerates partial shade and needs rich, well-drained soil. Turn over the soil to a depth of 10 to 12 inches, and remove stones and lumps that might cause the roots to split. When you're preparing the soil, dig in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet.

Plant the roots in a trench, and place them 24 inches apart with the narrow end down. Fill in the trench until the thicker end is just covered.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Keep the soil evenly moist so that the roots will be tender and full of flavor; horseradish gets woody in dry soils.

Pests

Horseradish has no serious pest problems.

Diseases

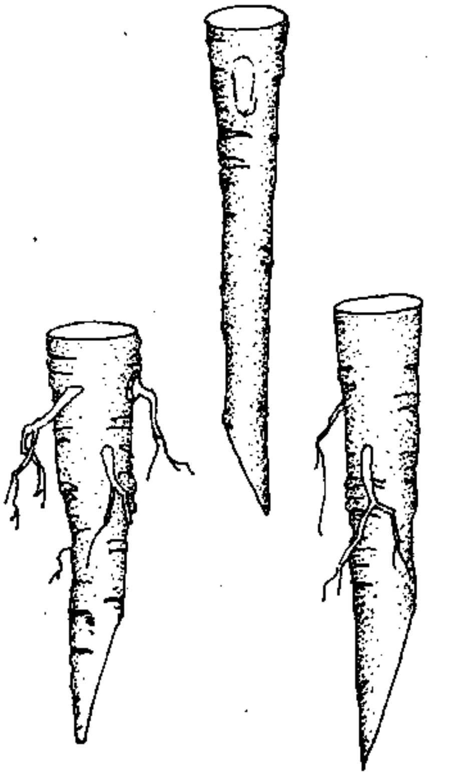
Horseradish has no serious disease problems.

When and how to harvest

Plants grown from roots cannot be harvested until the second year. A 10-foot row should give you six to eight roots. Horseradish makes its best growth in late summer and fall, so delay harvesting until October or later. Dig the roots as needed, or in areas where the ground freezes hard, dig them in the fall. Leave a little of the root in the ground so that you'll have horseradish the following year, too.

Storing and preserving

Store in a glass jar in the refrigerator one to two weeks. To freeze, grate the roots and mix with vinegar and water, as specified in "How to Freeze Vegetables." You can also dry horseradish or store the roots in a cold, moist place for 10 to 12 months. Detailed information on storing and preserving is given in Part 3.



Plant horseradish roots narrow end down.

Serving suggestions

Horseradish is a classic accompaniment to beef roasts and steaks. Serve it solo, freshly grated, to brave souls who appreciate its full flavor. For the less stern of stomach, calm the flavor with whipped or sour cream. Serve it as one of the dipping sauces with a beef fondue. Since the fumes are very strong, grate horseradish outdoors if you can. If you must do it indoors, use a blender.

Hot pepper,

See Pepper

Jerusalem artichoke

Common names: Jerusalem artichoke, sunchoke
Botanical name; Helianthus tuberosus
Origin: North America

Varieties

Few varieties are available; grow the varieties available in your area. You may find Jerusalem artichokes growing wild by the side of the road. Commercial Jerusalem artichokes are sometimes sold in supermarkets; use these to start your own crop.

Description

Jerusalem artichokes are large,-upright, hardy perennials, with small yellow flowers two to three inches across and rough, hairy leaves four to eight inches long. This plant, which grows five to 10 feet tall, was grown by the North American Indians for its tubers, which look like small potatoes. The tubers are low in starch and taste a bit like water chestnuts.

The Jerusalem artichoke isn't an artichoke, and it didn't come from Jerusalem. It's related to the sunflower, and the name is probably derived from the Italian name for a sunflower, *girasole,* which means turning to the sun.

where and when to grow

Jerusalem artichokes will grow anywhere, and in almost any soil as long as it's warm and well-drained. Plant the tubers two to three weeks before the average date of last frost for your area.

Jerusalem artichoke

How to plant

Give Jerusalem artichokes the least productive soil in your garden (provided the location is sunny); they'll probably love it, and they'll take over areas where nothing else will grow. Plant them as a screen or windbreak. Be sure you know where you want them before you plant, however, because once Jerusalem artichokes become established little short of a tornado will shift them. It's not necessary to fertilize the soil before planting. Plant the tubers two to six inches deep, 12 to 18 inches apart. You won't need to cultivate because weeds are no competition for a healthy Jerusalem artichoke.

Fertilizing and watering

Don't fertilize Jerusalem artichokes at midseason — they'll do fine on their own.

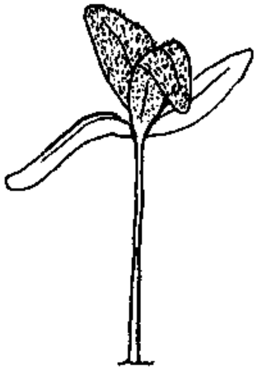
Water only during extremely dry periods. The plants themselves can survive long dry spells, but the tubers will not develop without a regular supply of water.

Pests

Aphids occasionally visit the Jerusalem artichoke, but they don't present any significant problem. If they do appear, pinch out infested foliage or hose the aphids off the plants. Chemically aphids can be controlled with Malathion or Diazinon. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Parti.

Diseases

Tuber rot may occur if the soil is not properly drained. Maintaining the general health and



Jerusalem artichoke seedling

cleanliness of your garden lessens the incidence of disease. If a plant does become infected, remove it before it can spread disease to healthy plants. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Part 1.

When and how to harvest

Time from planting to harvest is 120 to 150 days, and a 10-foot row should yield about 20 pounds of tubers. As the plant grows, cut off the flower stalks as soon as they appear; this will encourage tuber production. If the plant is using its energy to produce seeds, it won't produce tubers. (The flowers, in fact, are cheerful. If you're growing Jerusalem artichokes for decorative as well as practical purposes, you may be willing to sacrifice a few tubers so you can enjoy the flowers). Harvest the tubers when the leaves die back; dig them up with a spading fork, leaving a few in the ground for next year.

Storing and preserving

Store Jerusalem artichokes in the refrigerator for seven to 10 days, or store in a cold, moist place for two to five months. You

can also freeze Jerusalem artichokes or leave them in the ground as long as possible, and dig them up as you need them. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

The slightly nutty flavor of the Jerusalem artichoke goes well with mushrooms. Serve them cooked until tender then cooled and sliced, in a salad with mushrooms and a vinaigrette dressing. They can also be used raw, peeled, and thinly sliced, in a mushroom salad. Cooked, you can puree them, saute slices with tomatoes, or simply toss them with butter and seasonings as a side dish with meat or poultry. They can also be used as an extender in meat loaf.

Kale

Common names: kale, borecole, collards, green cabbage, German greens
Botanical name: Brassica oleracea acephala
Origin: horticultural hybrid

Varieties
Dwarf Blue Curled (55 days); Dwarf Blue Scotch (55 days); Vate; (55 days); Dwarf Green Curled (60 days).

Description

Kale is a hardy biennial plant grown as an annual. It's a member of the cabbage family and looks like cabbage with a permanent wave. Scotch kale has gray-green leaves that are extremely crumpled and curly; Siberian or blue kale usually is less curly and is a bluer shade of green. There are also decorative forms with lavender and silver variegated leaves.

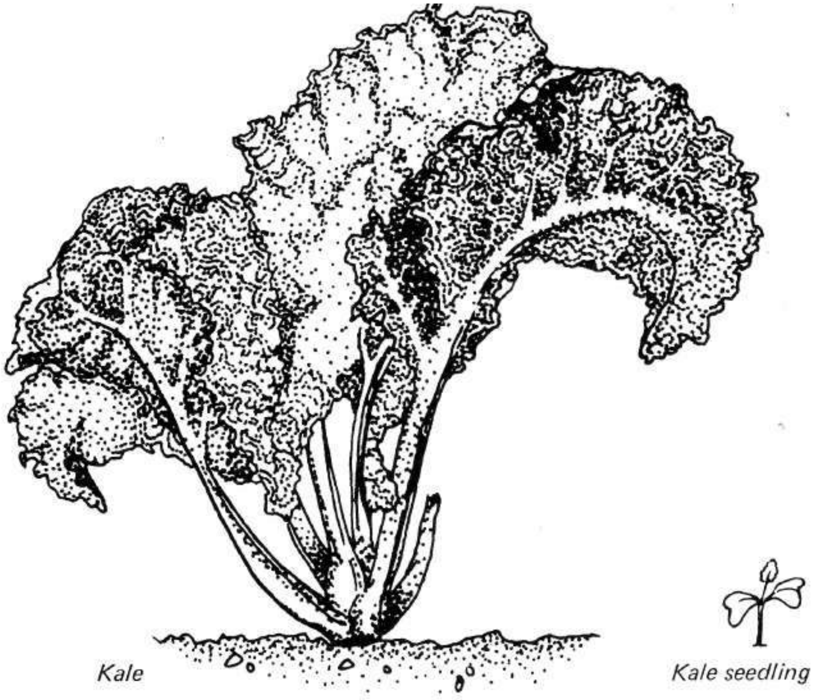
Where and when to grow

Kale is a cool-weather crop that grows best in the fall and will last through the winter as far north as Maryland and central Indiana. Frost even improves the flavor, and kale is better adapted for fall planting throughout a wide area of the United States than any other vegetable. Kale doesn't tolerate heat as well as the collard — which it resembles in being one of the oldest members of the cabbage or cole family. All cole crops are frost-hardy and can tolerate low 20°F temperatures. Kale does best in a cool growing season with day temperatures under 80°F. Time plantings so that you can harvest kale during cool weather. If your area has cold winters, plant for summer to early fall harvest. In mild climates, plant for late spring or early fall harvest. In the South, plant for harvest in late fall or winter. Plant kale from transplants early in the spring and again in the midsummer if your summers aren't too hot. Direct-seed in the fall.

Flowering varieties of kale can be planted in containers or as accent points in a flower bed. The leaves are attractive, and their color is at its best in cool fall weather.

How to plant

Kale likes fertile, well-drained soil with pH within the 6.5 to 7.5 range; this discourages disease and lets the plant make the most of the nutrients in the soil. Kale is



usually grown from transplants except where there is a long cool period, in which case seed can be sown directly in the garden in fall for winter harvest.

When you're preparing the soil for planting, work in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. If you have sandy soil or your area is subject to heavy rains, you'll probably need to supplement the nitrogen content of the soil. Use about a pound of nitrogen fertilizer for a 10-foot row.

Plant transplants that are four to six weeks old, with four or five true leaves. If the transplants are leggy or have crooked stems, plant them deeply (up to the first leaves) so they won't grow to be top-heavy. Plant the seedlings eight to 12 inches apart, in rows 18 to 24 inches apart. If you're planting seeds, set them half an inch deep and space them three inches apart. Thin them when they're big enough to lift by the true leaves, and either transplant the thinned seedlings or eat them right away.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Part 1.

Abundant soil moisture and cool moist air are needed for the best growth. Regular watering keeps kale growing strongly and prevents it from getting tough.

Pests

The cabbage family's traditional enemies are cutworms and caterpillars. Cutworms, cabbage loopers, and imported cabbage worms can all be controlled by spraying with bacillus thuringiensis, an organic product also known as Dipel or Thungicide. Kale does not suffer too much from pests, so it's a good choice for the organic gardener. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Parti.

Diseases

Kale has no serious disease problems.

When and how to harvest

Time from planting to harvest is 55 days from transplants, 70 to 80 days from seed. A 10-foot row will produce about 10 plants. Leave kale in the garden until needed. As the plants mature, take outside leaves, leaving the inner ones to grow, or cut off the entire plant. But harvest kale before it gets old and tough.

Storing and preserving

If possible, leave kale in the garden until you want to eat it. It will store in the refrigerator in a plastic bag for up to one week, or in a cold, moist place for up to three weeks. You can also freeze, can, or dry it; use the recipes for greens. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Young kale makes a distinctive salad green; dress it simply with oil and vinegar. You can also cook it in a little water and serve it with butter, lemon juice, and chopped bacon. Instead of boiling, try preparing it like spinach steamed with butter and only the water that clings to the leaves after washing. The Italians steam kale until tender, then add olive oil, a little garlic, and breadcrumbs, and sprinkle it with Parmesan cheese in the last minute or two of cooking. You can also prepare kale Chinese-style, stir-fried with a few slices of fresh gingerroot.

Kohlrabi

Common names: kohlrabi, turnip-rooted cabbage, stem turnip, turnip cabbage
Botanical name: Brassica caulorapa
Origin: horticultural hybrid

Varieties

Early White Vienna (55 days); Early Purple Vienna (60 days).

Description

Kohlrabi is a hardy biennial grown as an annual and is a member of the cabbage clan. It has a swollen stem that makes it look like a turnip growing on a cabbage root. This swollen stem can be white, purple, or green, and is topped with a rosette of blue-green leaves. In German, *kohl* means cabbage and *rabi* means turnip—a clue to the taste and texture of kohlrabi, although it is mild and sweeter than either of them. Kohlrabi is a fairly recent addition to the vegetables grown in northern

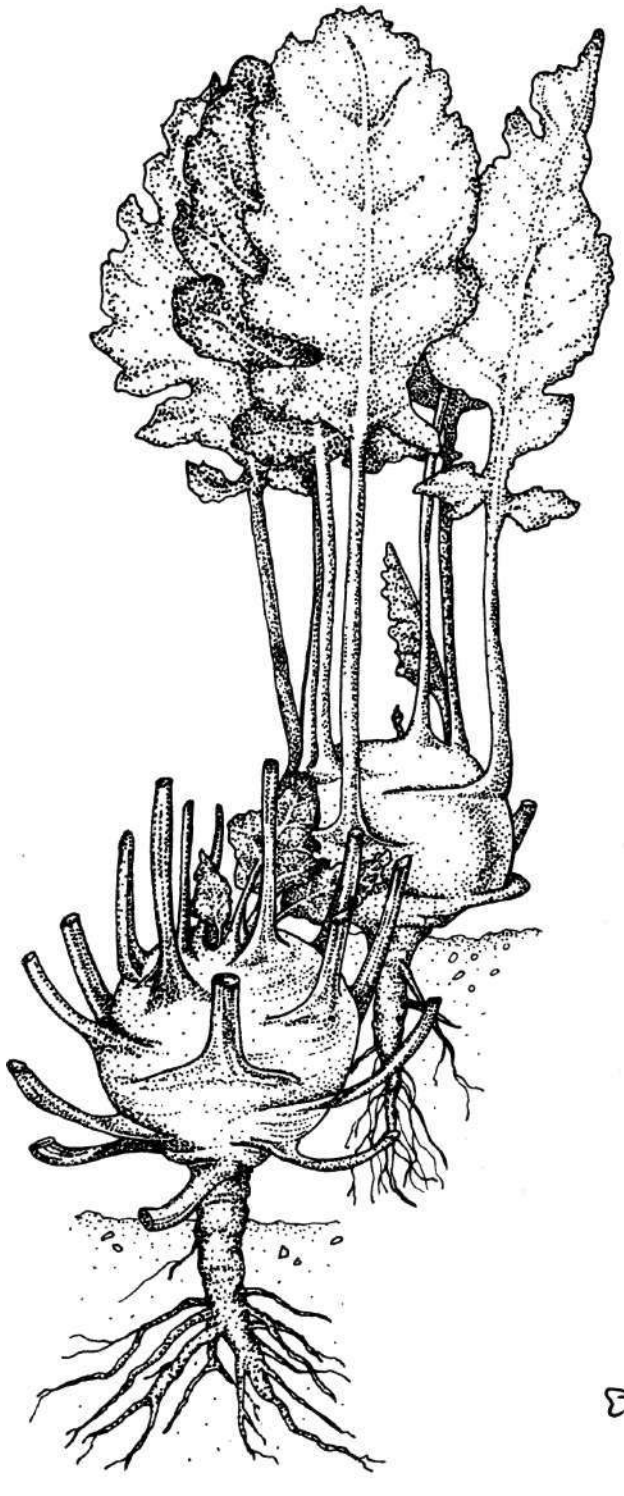
Europe. In this country, nobody paid it any attention until 1800,

Where and when to grow

All cole crops are hardy and can tolerate low 20°F temperatures. Kohlrabi tolerates heat better than other members of the cabbage family, but planting should be timed for harvesting during cool weather. Kohlrabi has a shorter growing season than cabbage. It grows best in cool weather and produces better with a 10° to 15°F difference between day and night temperatures. If your area has cold winters, plant for summer to early fall harvest. In the South, plant for harvest in late fall or winter. With spring plantings, start kohlrabi early so that most growth will occur before the weather gets too hot.

How to plant

Kohlrabi likes fertile, well-drained soil with a pH within the 6.5 to 7.5 range; this discourages disease and lets the plant make the most of the nutrients in the soil. The soil should be high in organic matter. When you're preparing the soil for planting, work in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Cole crops are generally grown from transplants except where there's a long cool period. Kohlrabi, however, can be grown directly from seed in the garden. Sow seeds in rows 18 to 24 inches apart and cover them with a quarter to a half inch of soil. When the seedlings are growing well, thin them to five or six inches apart—you can transplant the thinnings. Cultivate carefully to avoid harming the shallow roots.



Kohlrabi

Kohlrabi seedling

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Part 1. Kohlrabi should have even moisture or it will become woody.

Pests

The cabbage family's traditional enemies are cutworms and caterpillars. Cutworms, cabbage loopers, and imported cabbage worms can all be controlled by spraying with bacillus thuringiensis, an organic product also known as Dipel or Thungicide. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Parti.

Diseases

Cabbage family crops are susceptible to yellows, clubroot, and downy mildew. Lessen the incidence of disease by planting disease-resistant varieties when they're available; maintaining the general health of your garden; and avoiding handling the plants when they're wet. If a plant does become infected, remove and destroy it so it cannot spread disease to healthy plants. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Part 1.

Storing and preserving

Kohlrabi will store for one week in a refrigerator or for one to two months in a cold, moist place. Kohlrabi can also be frozen. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Small, tender kohlrabi are delicious steamed, without peeling. As they mature you can peel off the outer skin, dice them, and boil them in a little water. Kohlrabi can also be stuffed, like squash-

Try young kohlrabi raw, chilled, and sliced; the flavor is mild and sweet, and the vegetable has a nice, crisp texture. You can also cook kohlrabi, then cut it into strips and marinate the strips in an oil and vinegar dressing; chill this salad to serve with cold cuts. Cooked kohlrabi can be served just with seasoning and a little melted butter or mashed with butter and cream. For a slightly different flavor, cook it in bouillon instead of water.

Leek

Common name: leek
Botanical name: Allium porrum
Origin: Mediterranean, Egypt

Varieties
Titan (120 days); American Flag (120 days); Broad London (130 days); Tivi (115 days).

Description

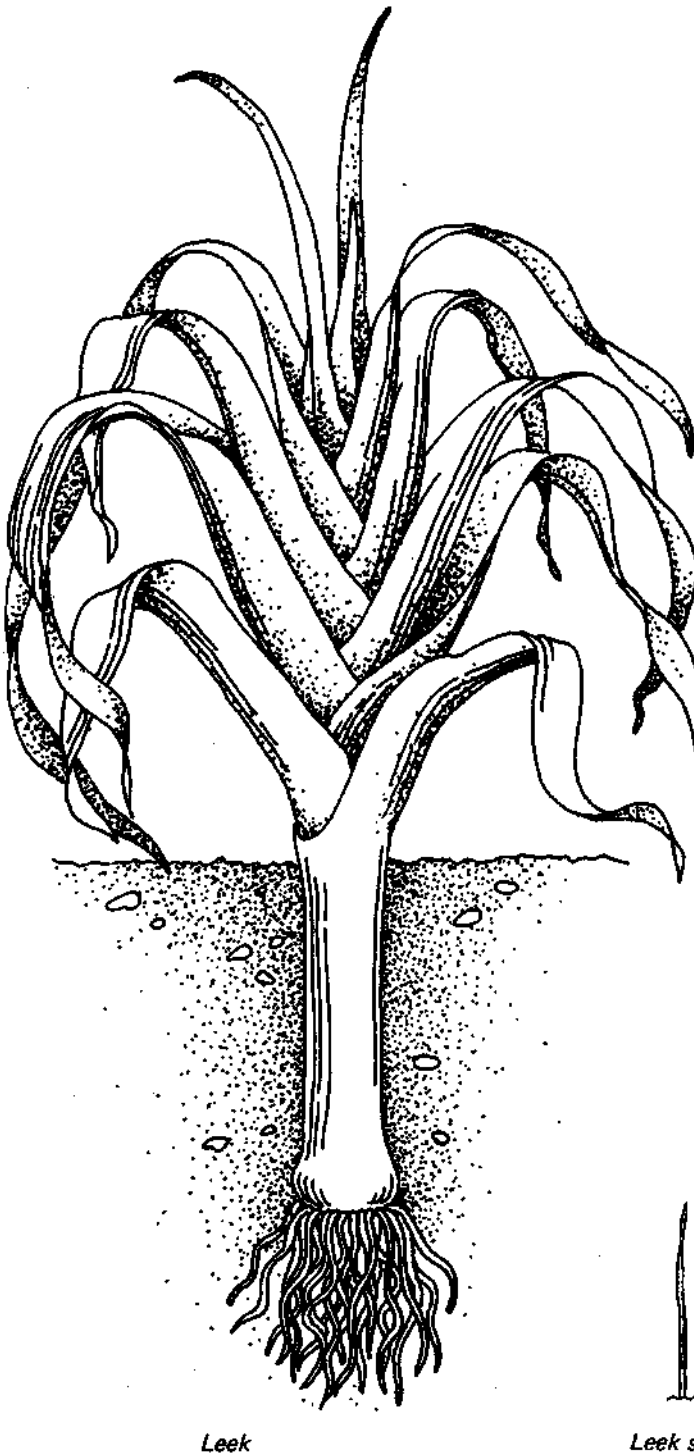
The leek is a hardy biennial grown as an annual. It's a member of the onion family, but has a stalk rather than a bulb and leaves that are flat and straplike instead of hollow. The Welsh traditionally wear a leek on St. David's day (March 1) to commemorate King Cadwallader's victory over the Saxons in A.D. 640, when the Welsh pulled up leeks and wore them as ID's. The more decorous now wear a daffodil instead.

Where and when to grow

Leeks are a cool-weather crop. They'll tolerate warm temperatures, but you'll get better results if the days are cool; temperatures under 75°F produce the best yields. Plant leeks from seed in the spring four to six weeks before the average date of last frost and from transplants in fall for a late harvest. Plant transplants in spring if you want to speed up the crop to avoid a hot summer.

How to plant

Leeks like a place in full sun and thrive in rich, well-worked soil with good drainage. When you're preparing the soil, dig in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Plant the seeds an eighth inch deep in rows 12 to 18 inches apart, and thin them six to nine inches apart. To plant transplants, make holes six inches deep, about six to nine inches apart, in well-worked soil. Double rows save space; to make them, stagger the plants with their leaves growing parallel to the rows so they will not grow into the pathway. Drop the leeks in the holes, but do not fill in with soil. Over a period of time, watering will slowly collapse the soil around the leeks and settle them in.



Leek

Leek seedling

Special handling

In order to grow a large, white, succulent leek, blanch the lower part of the stem by hilling the soil up around the stalk as It develops.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Give leeks plenty of water to keep them growing strongly.

Pests

Onion thrips may show up on leeks in dry weather. Discourage them by hosing them off the plants, or spray them with Malathion or Diazinon, Leeks will do well in the organic garden despite the thrips. More detailed information on pest control is given in "Keeping Your Garden Healthy" in Part 1.

Diseases

Leeks have no serious disease problems.

When and how to harvest

Time from planting to harvest is **about** 80 days from transplants and 120 days or more from seed. A 10-foot double row should give you about 20 leeks. Around midsummer, start removing the top half of the leaves. This will encourage greater growth of the leek stalk. Pull the leeks as you need them, but harvest them all before frost.

with small, yellowish flowers on the stalk. The lettuce most commonly found in supermarkets (iceberg or head lettuce) is the most difficult to grow in the home vegetable garden. Butterhead and bibb lettuces, which are often so extravagantly expensive in the store, are easier to grow. Butterhead lettuces have loose heads and delicate crunchy leaves. Stem lettuce (celtuce) might fool you into thinking you're eating hearts of palm and makes a crunchy addition to a salad. Celtuce is grown in the same way as lettuce, except that you *want* celtuce to bolt or go to seed, because you're going to harvest the thickened stem. You use the leaves of celtuce as you would regular lettuce; the heart of the stem is used like celery. Cos or romaine lettuce forms a loose, long head and is part way between a butterhead and leaf lettuce in flavor. Leaf lettuce is delightfully easy to grow, grows fast, and provides bulk and color to salads.

Leaf lettuce and butterhead lettuce make attractive borders or accents in a flower garden, and either kind can be grown singly in a four-inch pot or in a window box. With a little planning you can grow an entire salad garden in containers on a balcony or terrace.

Historically, King Nebuchadnezzar grew lettuce in his gardens in ancient Babylon. The Romans used lettuce as a sedative.

Where and when to grow

Lettuce is a cool-season crop, usually grown from seed planted in the garden four to six weeks before your average date of last frost. Long, hot summer days will make the plants bolt, or go to seed; when this happens the plant sends up a flower stalk and becomes useless as a vegetable. If your area has a short, hot growing season, start head lettuce from seed indoors eight to 10 weeks before your average date of last frost and transplant it as soon as possible so that the plants will mature before the weather gets really hot. Sow succession crops, beginning in midsummer. In a mild-winter climate, grow spring, fall, and winter crops.

How to plant

Lettuce needs well-worked soil with good drainage and moisture retention. When you're preparing the soil, dig in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Start transplants from seed eight to 10 weeks before your average date of last frost. If you are direct-

Bibb lettuce

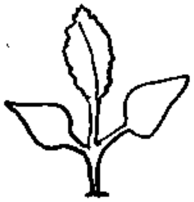
Leaf lettuce

seeding lettuce in the garden, sow seeds a quarter inch deep in wide rows, and when the seedlings are large enough to handle, thin leaf lettuce to stand six to eight inches apart and head lettuce 12 inches apart. Thinning is important; heading lettuce won't head, and all lettuce may bolt if the plants are crowded. Transplant the thinnings.

Fertilizing and watering

Give the entire garden a midseason application of fertilizer. Your successive crops of lettuce will benefit from it, even though you will already have harvested an early crop. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Always keep the soil evenly moist but not soggy, and don't let the shallow-rooted lettuce plants dry out. Heading lettuce needs careful watering when the head is forming. Try not to splash muddy water on the lettuce plants — the cleaner they are, the easier they are to prepare for eating. Use a light mulch of straw or hay to keep soil off the leaves.



Lettuce seedling

Pests

Cutworms, slugs, and snails can be troublesome. You may also have to deal with aphids. Put a collar around each plant to discourage cutworms, and trap slugs and snails with a saucer of stale beer set flush to the soil. To control aphids, pinch out infested foliage, or hose the aphids off the plants. Control aphids chemically with Malathion or Diazinon, taking care to spray the undersides of the leaves. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Part 1.

Diseases

Lettuce has no serious disease problems.

When and how to harvest

As the lettuce grows, either pick the outer leaves and let the inner leaves develop, or harvest the whole plant at once by cutting it off at ground level. Try to harvest when the weather is cool; in the heat of the day the leaves may be limp. Chilling will crisp up the leaves again.

Head lettuce

Head lettuce

Celtuce

storing and preserving

Don't harvest lettuce until you're ready to use it. It can be stored for up to two weeks in the refrigerator, and everyone has a favorite way of keeping it crisp. Some suggest washing the lettuce first, then wrapping it in a cotton or linen towel and keeping it in the refrigerator. Others suggest storing the whole lettuce in a plastic bag. You can't freeze, dry, or can lettuce, but you can sprout lettuce seeds. If you've got lots, share your bounty with friends. Detailed information on short-term storage is given in Part 3.

Serving suggestions

Yes, salads, of course — but there are other ways to serve lettuce. Braise it in butter with seasoning to taste — the French use nutmeg. Make a wilted salad or cream of lettuce soup, or stir-fry it with mushrooms and onions. Cook peas and shredded lettuce together in a little butter — throw in the lettuce just before you take the peas off the heat. Use several varieties of lettuce together for an interesting combination of shades and textures. Serve a very plain salad — a few leaves of lettuce dressed with oil and a good wine vinegar — to cleanse the palate between courses of a fancy dinner.

Lima bean,

See Bean, lima

Melon,

See Muskmelon; see also Watermelon

Mushroom

Common name: mushroom
Botanical name: Agaricus species
Origin: Mushrooms are found all over the world.

Varieties

Although there are many varieties of edible mushrooms, only a few are available for home production; grow the varieties that are available commercially.

Description

Mushrooms are the fruiting bodies of a fungus organism, and there are between 60,000 and 100,000 species of fungus that produce mushrooms. Because many mushrooms are poisonous, and it's extremely difficult to tell the edible variety from the poisonous kind, gathering wild mushrooms to eat is a very risky pastime. There are, however, many good books on the market that will help you recognize some of the 50 or more edible varieties that grow wild in the United States; so if you do want to go mushroom-hunting, do a little homework first. You can also grow mushrooms at home from prepared trays, kits, and spawn that are available commercially through seed catalog companies and garden suppliers. It's not too difficult, and it can be both productive and fun.

Where and when to grow

Because you're growing them indoors, the type of climate you live in is a matter of indifference to your mushrooms. You can also grow them at any time of the year, but the trays or kits are usually available commercially only from October through April.

How to plant

Mushrooms grow best in a dark, humid, cool area. In most homes the best places are the basement and the cabinet under the kitchen sink. A little light won't hurt the mushrooms, but they do need high humidity — 80 to 85 percent — and a cool temperature —55° to 60°F.

Mushrooms for growing at home are available in two different forms — in kits or as spawn. You can buy prepared trays and kits already filled with the growing medium and the mushroom spores. All you have to do is remove the tray from the package, add an inch of topsoil, and water. Keep them in a dark, humid, cool place, and you should be harvesting mushrooms within about four weeks.

Many seed companies also sell mushroom spawn; growing from spawn is less expensive, but it does require a little more care. Plant half-inch pieces of the spawn about two inches deep and eight to 10 inches apart in a well-rotted strawy horse or cow manure. Keep the planted spawn in a dark, humid room with the temperature at about 70°F for the first 21 days; then lower the temperature to about 60°F and cover the bed with a one-inch layer of good, sterilized topsoil. If the conditions are right, you should be able to start harvesting in about four weeks.

Fertilizing and watering

You don't need to fertilize mushrooms.

Keep them moist; don't let the mushrooms dry out, but don't allow water to stand on the soil.

Pests

Pests present no serious problems when you're growing mushrooms at home.

Diseases

Mushrooms grown at home have no serious disease problems.

When and how to harvest

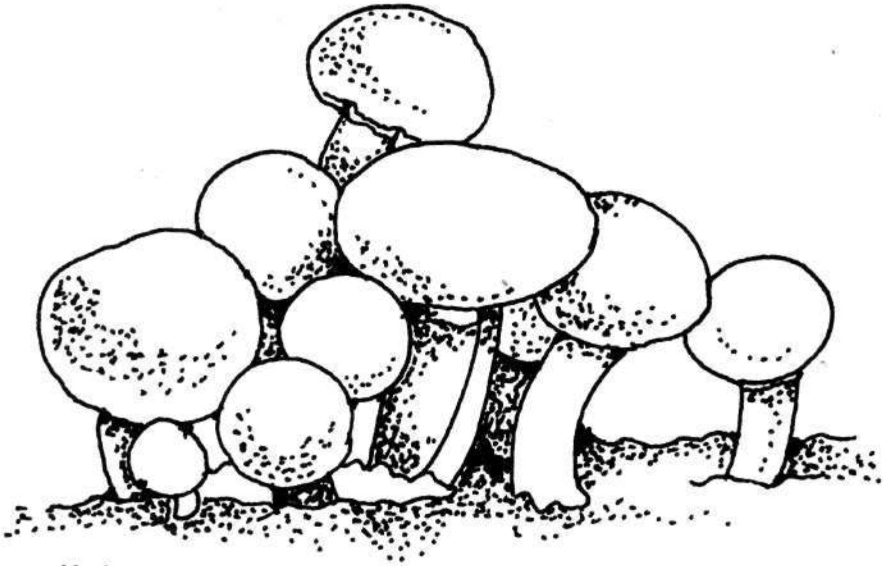
Whether you're growing mushrooms from a kit or from spawn, you'll wait about four weeks for results. You can harvest the mushrooms as immature buttons, before the caps open, or when the cap is fully open and the gills exposed — at this stage the mushrooms are ripe and their flavor is at its highest level. Never pull the mushrooms out of the soil; cut them off at soil level with a sharp knife. Check and harvest your mushrooms every day; if you leave mature mushrooms in the planting bed your yield will be lower, but if you pick them regularly the bed will produce continuously for as long as six months.

Storing and preserving

Mushrooms can be stored in the refrigerator up to one week. You can also freeze, can, or dry them. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Fresh mushrooms are wonderful raw, sliced thinly and eaten alone or tossed in a green salad. Simmer them in red wine and tomatoes with parsley and herbs for a delicious vegetarian supper dish. Stuff them with herbed breadcrumbs and broil them, or saute them lightly and toss them in with a dish of plain vegetables — try them with zucchini. Use mushrooms in your stir-fry Oriental dishes; the quick cooking preserves their flavor and texture. You can also fold them into an omelette topped with sherry sauce for an elegant lunch dish.



Mushroom

Muskmelon

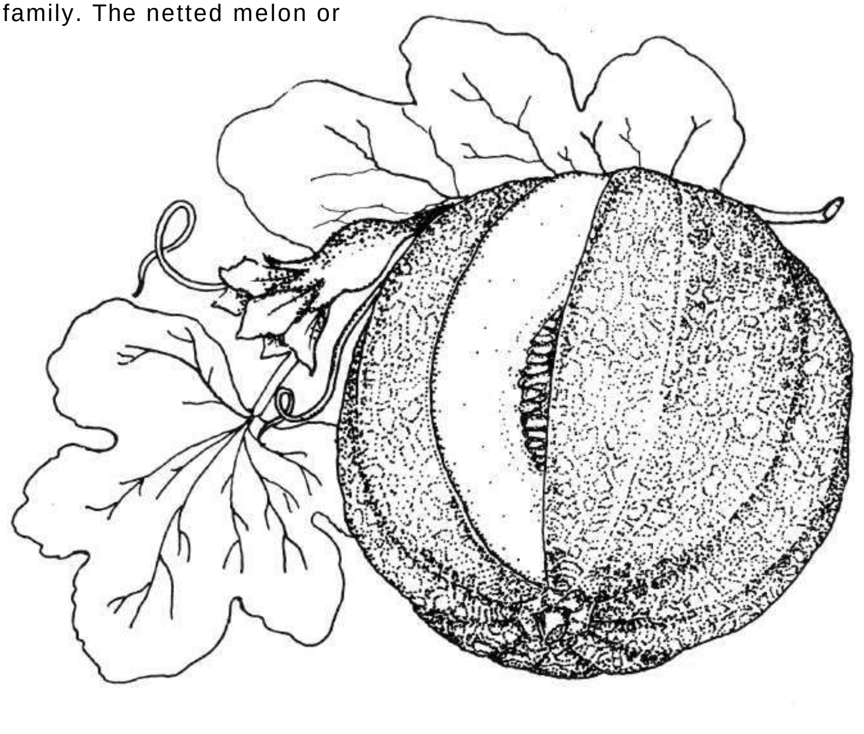
Common names: muskmelon, cantaloupe, cantaloup
Botanical name: Cucumis melo
Origin: South Asia, tropical Africa

Varieties
Muskmelons are very dependent on climate and growing conditions. Check with your garden center or local extension office for the varieties that grow best in your area.

Description

The muskmelon is a long, trailing annual that belongs to the cucumber and watermelon family. The netted melon or muskmelon is usually called a cantaloupe, but it should not be confused with the real cantaloupe, which is a warty or rock melon. The word cantaloupe means "song of the wolf" and was the name of an Italian castle. In 1885, when William S. Ross brought two barrels of muskmelons into the South Water Market in Chicago, everyone laughed at the little melons. Ross, however, laughed all the way to the bank. The U.S. Department of Agriculture spells it cantaloup, without the final "e."

Another type of melon you may like to try in your garden is the honeydew. It's sometimes referred to as a winter melon, but again the name is inaccurate — the true winter melon is a Chinese vegetable. Honeydews have a smoother surface than muskmelons, and lack their distinctive odor. They also ripen later and require a longer growing season, which means that they will not ripen fully in short-season areas. Your Cooperative Extension Service will advise you on growing honeydews in your area. The following growing information for muskmelons applies also to honeydews.


Muskmelon

Where and when to grow

Muskmelon is a tender, warm-weather plant that will not tolerate even the slightest frost. It also has a long growing season, which means that you must be careful to select a variety suited to your area's climate. In cool areas you'll do better with small-fruited varieties; in warmer areas, where you can accommodate their need for a longer season, you can grow the large varieties. In cool areas grow muskmelons from transplants, using individual, plantable containers at least four inches in diameter so that the root systems are not disturbed when you plant them. Set the plants in the garden when the ground is thoroughly warm, two to three weeks after your average date of last frost.

How to plant

Muskmelons must have full sun and thrive in well-drained soil that is high in organic matter. When you're preparing the soil, dig in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Grow muskmelons in inverted hills spaced four to six feet apart. If you're planting from seed, plant six to eight seeds in each hill; when

the seedlings have developed three or four true leaves, thin them to leave the strongest two or three seedlings In each hill. Cut the thinned seedlings with scissors at soil level to avoid damaging the survivors' root systems. Where cucumber beetles, other insects, or weather are a problem, wait a bit before making the final selection. If you're using transplants, put two or three in each hill.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

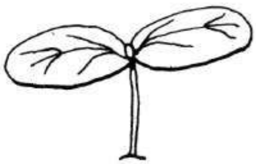
Muskmelons need a lot of water while the vines are growing. Be generous with water until the melons are mature, then stop watering while the fruit ripens.

Special handling

To keep competitive plants weeded out, cultivate carefully until the vines cover the ground. The roots are very shallow and extend quite a distance, so proceed with caution. You can grow muskmelons three feet apart on fences instead of in Inverted hills. As the fruits develop, they may need support if you're growing them on a fence. A net or bag will do the job — try using old pantyhose. If the muskmelons are growing in a hill, put a board under each melon to keep it off the ground.

Pests

Aphids and cucumber beetles are the pests you're most likely to encounter. To control aphids.



Muskmelon seedling

pinch out infested vegetation, hose them off the vines, or spray the aphids with Malathion or Diazinon. Cucumber beetles may not do much feeding damage, but they carry cucumber bacterial wilt. Hand-pick them off the vines promptly, or spray them with carbaryl. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Parti.

Diseases

Muskmelon vines are susceptible to wilt, blight, mildew, and root rot. Planting disease-resistant varieties when possible and maintaining the general cleanliness and health of your garden will help cut down the incidence of disease. If a plant does become infected, remove and destroy it before it can spread disease to healthy plants. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Parti.

When and how to harvest

Time from planting to harvest is 60 to 110 days, depending on type, and in a good season you might get 10 melons from a 10-foot row. Leave melons on the vine until they're ripe; there is no increase in sugar after harvesting. Mature melons slip easily off the stem; a half-ripe melon needs more pressure to remove than a ripe melon, and often comes off with half the stem attached.

Storing and preserving

You can store muskmelons up to one week in the refrigerator or, if you have a lot, for two to three weeks in a cool, moist place. You can also freeze your extras or make pickles with them. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Muskmelon or honeydew is delicious by itself. A squeeze of lemon or lime juice brings out the flavor nicely. Or fill the halves with fruit salad, yogurt, or ice cream. You can also scoop out the flesh with a melon-baller, and freeze the balls for future use. Mix balls or chunks of different types of melon for a cool dessert. Serve wedges of honeydew with thinly sliced prosciutto as an appetizer.

Mustard

Common names: mustard, Chinese mustard, leaf mustard, spinach greens
Botanical name: Brassica juncea
Origin: Asia

Varieties

Tendergreen (spinach mustard, 30 days); Green Wave (45 days); Southern Giant Curled (40 days).

Description

Mustard is a hardy annual with a rosette of large light or dark green

Mustard

crinkled leaves that grow up to three feet in length. The leaves and leaf stalks are eaten. The seeds can be ground and used as a condiment. If you had lived in ancient Rome, you would have eaten mustard to cure your lethargy and any pains you suffered.

Where and when to grow

Mustard is a cool-season crop; it's hardy, but the seeds will not germinate well if you sow them too early, so plant seeds in the garden on your average date of last frost. Mustard is grown like lettuce; it is more heat-tolerant than lettuce, but long hot summer days will force the plants to bolt and go to seed. As mustard has a very short growing season, most areas of the United States can accommodate it without any problems.

How to plant

Mustard tolerates partial shade and needs well-worked soil, high in organic matter, with good drainage and moisture retention. When you're preparing the soil, dig in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Plant the seeds half an inch deep in rows 12 to 24 inches apart, and when the seedlings are large enough to handle, thin them to stand six to 12 inches apart. Transplant the thinned seedlings, or eat them in soups or as greens. For a continuous harvest, plant a few seeds at intervals, rather than an entire row at one time. As soon as the plants start to go to seed, pull them up or they will produce a great number of seeds and sow themselves all over the garden. Plant mustard again when the weather begins to cool off.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Part 1.

Water mustard before the soil dries out to keep the leaves growing quickly.

Pests

Mustard is almost always attacked by some pest or other and is more susceptible than other crops to attack by flea beetles and aphids. Hand-pick or hose these pests off the plant, or pinch out aphid-infested foliage. Or use a chemical spray of Malathion or Diazinon. Because of its pest problems, mustard is not the ideal crop for the organic gardener. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Part 1.

Diseases

Mustard has no serious disease problems.

When and how to harvest

Pick off individual leaves as they grow, or cut the entire plant. Harvest when the leaves are young and tender; in summer the leaf texture may become tough and the flavor strong. Harvest the whole crop when some of the plants start to go to seed.

storing and preserving

You can store mustard in the refrigerator for up to one week, or you can freeze, can, or dry your excess crop; use the recipes for greens. You can also sprout mustard seeds. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Use young, tender leaves of mustard in a salad, alone or mixed with other greens. Boil the older leaves quickly in just the water that clings to them after washing; dress them with a little olive oil and vinegar, or add some crumbled bacon. Substitute mustard greens for spinach in an omelette or *frittata.*

Mung bean,

See **Bean, mung**

New Zealand spinach,

See **Spinach**

Okra

Common names: okra, lady's fingers, gumbo
Botanical names: Hibiscus esculentus
Origin: Africa

Varieties
Emerald (56 days); Clemson Spineless (58 days); Dwarf Green Long Pod (52 days).

Okra

Okra seedling

Description

Okra, a member of the cotton and hibiscus family, is an erect, tender annual With hairy stems and large maplelike leaves. It grows from three to six feet tall, and has large flowers that look like yellow hibiscus blossoms with red or purplish centers. When mature, the pods are six to 10 inches long and filled with buckshotlike seeds. Okra is used in Southern cooking, in gumbo or mixed with tomatoes.

Where and when to grow

Okra is very sensitive to cold; the yield decreases with temperatures under *70°f,* but it has a short season, which permits it to be grown almost anywhere in the United States. Plant okra from seed in the vegetable garden about four weeks after your average date of last frost. Okra does not grow well in containers.

How to plant

Okra will grow in almost any warm, well-drained soil and needs a place in full sun. When you're preparing the soil, dig in a complete well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Plant the seeds a half inch to an inch deep in rows 24 to 36 inches apart, and when the seedlings are growing strongly, thin them to stand 12 to 18 inches apart.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Keep the plants on the dry side. The stems rot easily in wet or cold conditions.

Special handling

Don't work with okra plants when they're wet. You may get an allergic reaction.

Pests

Flea beetles and aphids may visit okra. Spray flea beetles with carbaryl. Pinch out aphid-infested vegetation, control the aphids chemically with Malathion or Diazinon. Detailed Information on pest control is given in "Keeping Your Garden Healthy" in Parti.

Diseases

Okra may be attacked by verticillium or fusarium wilt. Okra varieties are not resistant to these diseases, but maintaining the general cleanliness and health of your garden will help cut down the incidence of disease. If a plant does become infected, remove it before it can spread disease to healthy plants. Rotate crops to prevent the buildup of diseases in the soil. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Part 1.

When and how to harvest

Time from planting to harvest is 50 to 65 days, and a 10-foot row will yield about six pounds of pods. When the plants begin to set their pods, harvest them at least every other day. Pods grow quickly, and unless the older ones are cut off the plant will stop producing new ones. Okra will grow for a year if not killed by frost and if old pods are not left on the plant. Keep picking the pods while they are quite small; when they're only about two inches long they are less gluey. If you let the pods mature you can use them in winter flower arrangements; the pods and the stalks are quite dramatic.

Storing and preserving

Pods will store in the refrigerator for seven to 10 days. You can also freeze, can, or dry them. Detailed information on storing and preserving is given in Part 3,

Serving suggestions

Many people are disappointed because their first mouthful often tastes like buckshot in mucilage. A taste for okra is perhaps an acquired one. Try it in gumbo, mixed with tomatoes, or sauteed.

Onion

Common name: onion
Botanical name: Allium cepa
Origin: Southwest Asia

Varieties

Soil and growing conditions affect the flavor of an onion as much as the variety, so check with a garden center or with your Cooperative Extension Service for specific varieties that will do well in your area.

Description

Onions are hardy biennial vegetables usually grown as annuals. They have hollow leaves, the bases of which enlarge to form a bulb. The flower stalk is also hollow, taller than the leaves, and topped with a cluster of white or lavender flowers. The bulbs vary in color from white through yellow to red. All varieties can be eaten as green onions, though spring onions, bunching onions, scallions, and green onions are grown especially for their tops. Green onions take the least time to grow. Bermuda and Spanish onions are milder than American onions. American and Spanish onions generally take longer to mature than Bermuda onions.

Where and when to grow

Most onions are sensitive to day length. The American and Spanish onions need long days to produce their bulbs, and the Bermuda onion prefers short days. Onions are also sensitive to temperature, generally requiring cool weather to produce their tops and warm weather to produce their bulbs. They're frost-hardy, and you can plant whichever variety you're using four weeks before your average date of last frost. In the South, onions can be planted in the fall or winter, depending on the variety.

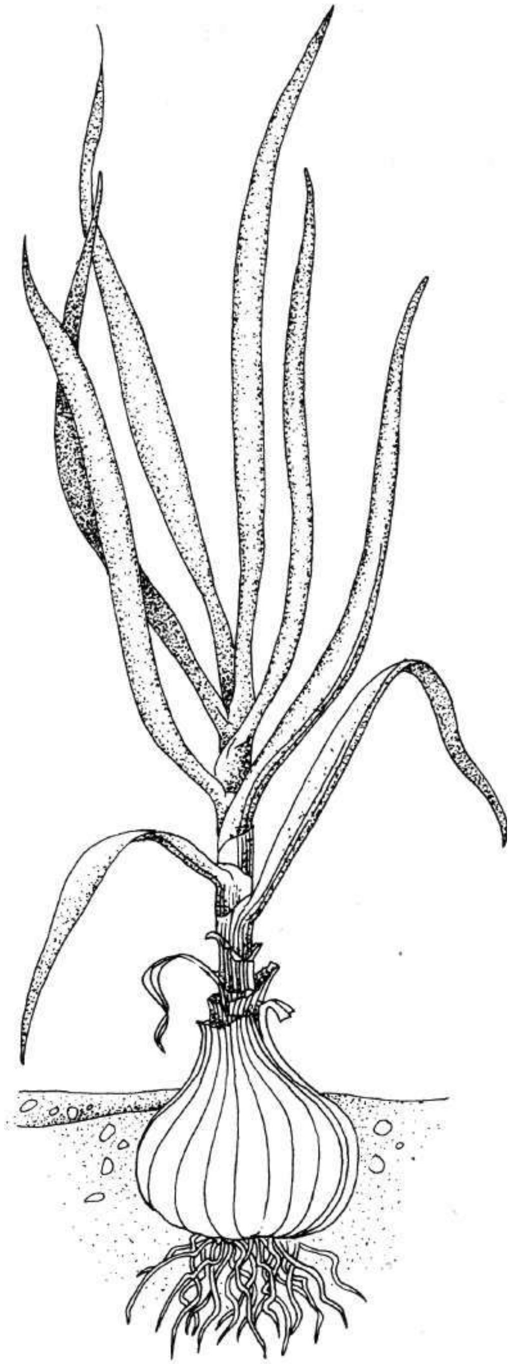
How to plant

Onions are available in three forms — seeds, transplants, and sets. Sets are onions with a case of arrested development — their growth was stopped when they were quite small. The smaller the sets are, the better; any sets larger than the nail of your little finger are unlikely to produce good bulbs. Sets are the easiest to plant and the quickest to produce a green onion, but they are available in the least number of varieties, and are not the most reliable for bulb production — sometimes they'll shoot right on to the flowering stage without producing a bulb. Transplants are available in more varieties than sets and are usually more reliable about producing bulbs. Seeds are the least expensive and are available in the greatest variety, but they have disease problems that sets don't have and take such a long time to grow that the forces of nature often kill them before they produce anything.

In limited space you can grow onions between other vegetables, such as tomatoes or cabbages, or tuck them in among flowers — they don't take much room. They can also be grown in containers. An eight-inch flowerpot can hold eight to 10 green onions.

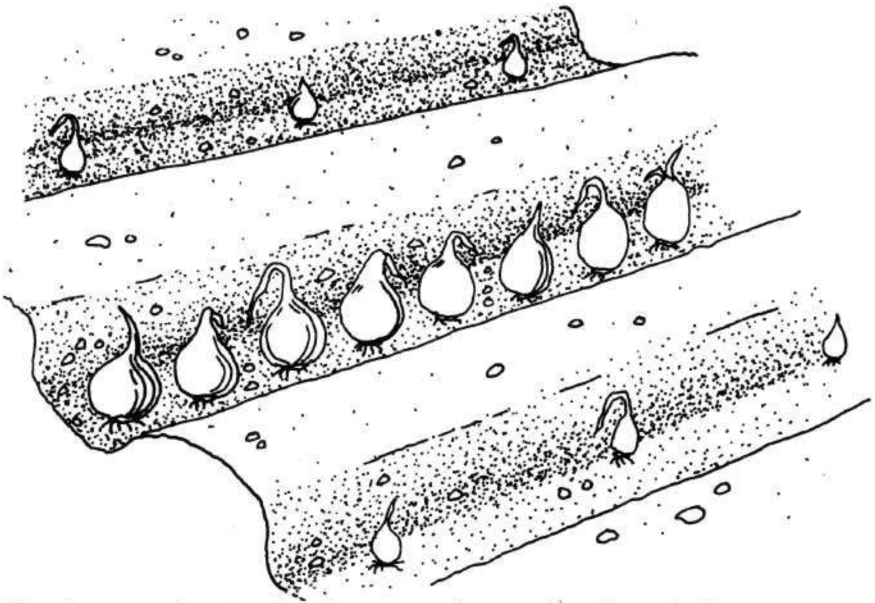
Onions appreciate a well-made, well-worked bed with all the lumps removed to a depth of at least six inches. The soil should be fertile and rich in organic matter. Locate most bulbs in full sun — green onions can be placed in a partially shady spot. When you're preparing the soil, dig in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet.

When you plant transplants and sets, remember that large transplants and large sets (over three quarters inch in diameter) will often go directly to seed and should be grown only for green or pulling onions. Grow



Onion

smaller transplants or sets for bulbs. Plant transplants or sets an inch to two inches deep, and



Plant large sets close together for green onions, and small sets farther apart for dry onions.

two to three inches apart, in rows 12 to 18 inches apart. The final size of the onion will depend on how much growing space it has. The accompanying illustration shows how to plant onion transplants or sets. If you're planting onions from seed, plant the seeds a quarter inch deep in rows 12 to 18 inches apart, and thin to one to two inches apart.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

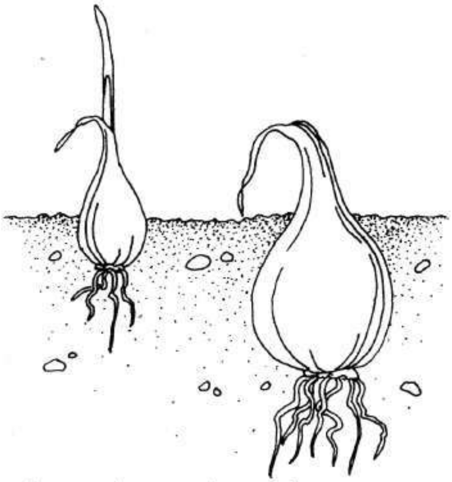
The soil should not be allowed to dry out until the plants have started to mature — at this stage the leaves start to get yellow and brown and to droop over. Then let the soil get as dry as possible.

Special handling

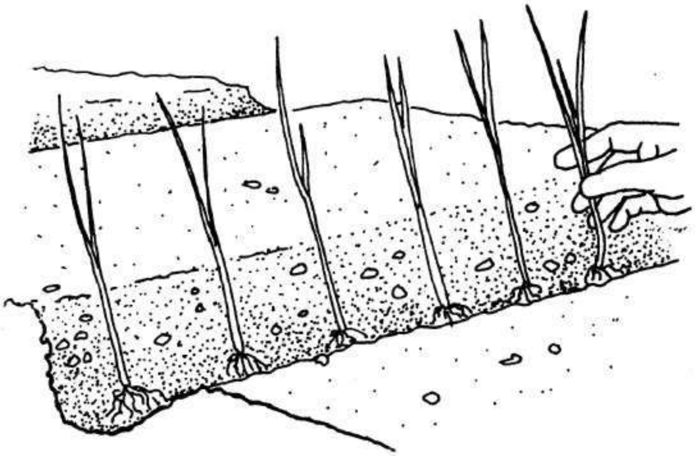
Onions are not good fighters; keep the weeds from crowding in and taking all their food and water. Keep the weeds cut off from the very beginning since they are hard to remove when they snuggle up to the onion. Thin conscientiously; in a crowded bed onions will mature when very small without growing a bulb.

Pests

Onion thrips and maggots are the pests to watch for. Discourage thrips by hosing them off the plants, or control them chemically with Malathion or Diazinon. Prevention is the best nonchemical control for maggots — put a three- or four-



Plant large onion sets deeper than small sets.



Space onion transplants to allow room for growth.

inch square of plastic around the plants to discourage flies from laying their eggs near the plants. To control maggots chemically, drench the soil around the plants with Diazinon at the first sign of damage. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Parti.

Diseases

In areas that produce onions commercially, onions are susceptible to bulb and root rots, smut, and downy mildew. Planting disease-resistant varieties when possible and maintaining the general cleanliness and health of your garden will help cut down the incidence of disease. If a plant does become infected, remove it before it can spread disease to healthy plants. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Parti.

When and how to harvest

Harvest some leaves for flavoring throughout the season, and harvest the green onions when the bulb is full but not much larger in diameter than the leaves. Harvest dry onion bulbs after the leaves have dried. Lift them completely out of the soil; if the roots touch the soil they may start growing again and get soft and watery.

Storing and preserving

Store green onions in the refrigerator for up to one week. Let mature bulbs air-dry for about a week outside; then store them in a cold, dry place for up to six or seven months. Do not refrigerate mature onions. You can also freeze, dry, or pickle onions. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Onions are probably the cook's most indispensable vegetable. They add flavor to a huge variety of cooked dishes, and a meat stew or casserole without onions would be a sad thing indeed. Serve small onions parboiled with a cream sauce, or stuff large ones for baking. Serve onion slices baked like scalloped potatoes. Perk up a salad with thin onion rings, or dip thick rings in batter and deep-fry them. Serve onions as one of the vegetables for a tempura. Add chopped, sauteed onion to a cream sauce for vegetables, or fry a big panful of slices to top liver or hamburgers. Serve pickled onions with cheese and crusty bread for a "farmer's lunch." It's virtually impossible to run out of culinary uses for your onion crop.

Parsnip

Common name: parsnip
Botanical name: Pastinaca sativa
Origin: Europe

Varieties

Hollow Crown improved (95 days). All American (105 days), Harris Model (120 days).

Description

Parsnips are biennals grown as annuals and belong to the same family as celery, carrots, and parsley. A rosette of celerylike leaves grows from the top of the whitish, fleshy root. Parsnips taste like sweet celery hearts. Roman Emperor Tiberius demanded annual supplies of parsnips from Germany. Parsnips were the potato of medieval and Renaissance Europe.

Where and when to grow

Parsnips need a long, cool growing season. They will tolerate cold at both the start and the end of their growing season, and they can withstand freezing temperatures. Plant them from seed two to three weeks before the average date of last frost.

How to plant

Parsnips prefer full sun but will tolerate partial shade. Before planting, work a 5-10-10 fertilizer into the soil at the rate of half a cup to 100 square feet. Turn the soil thoroughly to a depth of 10 to 12 inches, and remove all lumps and rocks. This initial-soil preparation is essential for a healthy crop; soil lumps, rocks, or other obstructions in the soil will cause the roots to split, fork, or become deformed. Don't use manure in the soil bed for root crops unless it is very well-rotted; it may also cause forking. Plant seeds a half inch deep in wide rows 18 to 24 inches apart. When the seedlings develop two true leaves, thin them to two to four inches apart. Thinning is very important; parsnips must have adequate space for root development. Do not pull out the thinned seedlings; cut them off at ground level to avoid disturbing the remaining seedlings.

Parsnip

Parsnip seedling

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential.Soil" in Parti.

To keep parsnips growing quickly, give them plenty of water. As they approach maturity, water less; too much moisture at this stage may cause the roots to crack.

Special handling

In areas with high soil temperature, roots will grow short unless you mulch to regulate the soil temperature. Control weeds, especially during the first few weeks, but cultivate shallowly to avoid damaging the young roots.

Pests

Parsnips have few enemies, but root maggots may be troublesome. Discourage flies from laying eggs near the plants by putting a three- or four-inch square of plastic around each plant. Control maggots chemically by drenching the soil around the plants with Diazinon. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Part 1.

Diseases

Parsnips have no serious disease problems.

When and how to harvest

Leave the parsnips in the soil as long as possible or until you need them. The roots are not harmed by the ground's freezing. In fact. some people think this makes them taste better. The low temperatures convert the roots' starch to sugar. Dig them up before the ground becomes unworkable.

Storing and preserving

Store parsnips in the *i* refrigerator for one to three weeks, or in a cold, moist place for two to six months. You can also freeze them. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Parsnips can be cooked like carrots. If the roots are very large, remove the tough core after cooking. Put parsnips around a beef roast so that they cook in the meat juices, or puree them and add butter and seasonings.

Pea

Common names: pea, sweet pea, garden pea, sugar pea, English pea
Botanical name: Pisum sativum
Origin: Europe, Near East

Varieties
Shelling types: Little Marvel (62 days); Frosty (64 days); Wando (75 days); Dwarf Grey Sugar (65 days). **Edible-pod types:** Giant Melting (65 days); Melting Sugar (69 days); Oregon Sugar Pod (75 days); Sugar Snap (65 days).

Description

Peas are hardy, weak-stemmed, climbing annuals that have leaflike stipules, leaves with one to three pairs of leaflets, and tendrils that they use for climbing. The flowers are white, streaked, or colored. The fruit is a pod containing four to 10 seeds, either smooth or wrinkled depending on the variety. Custom has it that you can make a wish if you find a pea pod with nine or more peas in it.

Edible-pod peas are a fairly recent development. Grow them the same way as sweet peas, but harvest the immature pod before the peas have developed to full size. Peas have traditionally been a difficult crop for the home gardener to grow, with yields so low that it was hardly worth planting them. The introduction of the new easy-to-grow varieties of edible-pod peas has made growing peas a manageable undertaking for the home gardener, and no garden should be without them. All you need to grow peas is cool weather and a six-foot support trellis.

Where and when to grow

Peas are a cool-season crop that must mature before the weather gets hot. Ideal growing weather for peas is moist and between 60° and 65°F, Plant them as soon as the soil can be worked in spring — about six weeks before the average date of last frost.

How to plant

Peas tolerate partial shade and need good drainage in soil that is high in organic material. They produce earlier in sandy soil, but yield a heavier, later crop if grown in clay soil. Although soaking seeds can speed germination, a lot of seed can be ruined by oversoaking, and peas are harder to plant when they're wet, because the seeds tend to break. Before planting, work a complete well-balanced fertilizer into the soil at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Plant the peas two inches deep, one to two inches apart, in rows 18 to 24 inches apart.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

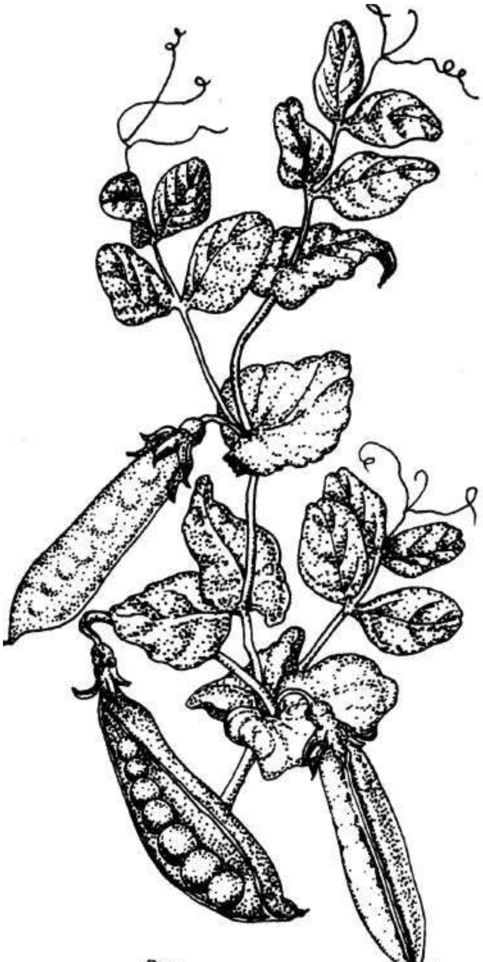
Peas need ample moisture; don't let the soil dry out. When the vines are flowering, avoid getting water on the plants; it may damage the flowers and reduce the crop.

Special handling

Provide trellises to support the pea vines. Cultivate very gently to avoid harming the fragile roots.

Pests

Aphids, rabbits, birds, and people are attracted to pea vines. Control aphids by pinching out infested foliage or by hosing them off the vines. Fence out the rabbits, and discourage birds with a scarecrow. Stern words may do the trick with human trespassers. Despite this competition, peas are an excellent crop for any garden. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Parti.



Pea

Diseases

Peas are susceptible to rot, wilt, blight, mosaic, and mildew. New, highly disease-resistant varieties are available; use them to cut down on disease problems in your garden. You will also lessen the incidence of disease if you avoid handling the vines when they're wet, and if you maintain the general health and cleanliness of the garden. If a plant does

become diseased, remove and destroy it before it can spread disease to healthy plants. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Parti.

When and how to harvest

Time from planting to harvest is from 55 to 80 days. A 10-foot row may give you about three pounds of pods. Pick shelling peas when the pods are full and green, before the peas start to harden. Overmature peas are nowhere near as tasty as young ones; as peas increase in size, the sugar content goes down as the starch content goes up. Sugar will also begin converting to starch as soon as peas are picked. To slow this process, chill the peas in their pods as they are picked and shell them immediately before cooking.

Harvest edible-pod peas before the peas mature. Pods should be plump, but the individual peas should not be competely showing through the pod.

Storing and preserving

Storing fresh shelling peas is seldom an issue for home gardeners; there are seldom any left to store but they can be stored in the refrigerator, unshelled, up to one week. You can sprout, freeze, can, or dry peas. Dried peas can be stored in a cool, dry place for 10 to 12 months. Edible-pod peas are also so good raw that you may not even get them as far as the kitchen. If you do have any to spare, you can store them in a plastic bag in the refrigerator for seven to 10 days. Edible-pod peas also freeze well and, unlike shelling peas.

Pea seedling

lose little of their flavor when frozen. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Freshly shelled peas are a luxury seldom enjoyed by most people. Cook them quickly in a little water and serve them with butter and chopped mint. Or add a sprig of mint during cooking. Fresh peas and boiled new potatoes are the perfect accompaniment for a lamb roast. Toss cold, cooked peas into a salad, or add them to potato salad — throw in diced cooked carrots as well, and you've got a Russian salad. Simmer peas in butter with a handful of lettuce tossed in at the end of the cooking time. Or try lining the pot with lettuce leaves and cooking the peas briefly over low heat. Add a few sauteed mushrooms or onions for a sophisticated vegetable dish. Add edible pod peas to a stir-fry dish — the rapid cooking preserves their crisp texture and delicate flavor. Eat them raw, or use them alone, lightly steamed, as a side dish.

Pea, black-eyed

Common names: pea, black-eyed pea, cowpea, chowder pea, southern pea, black-eyed bean, China bean
Botanical name: Gigna sinensis
Origin: Asia

Varieties

California Black Eye (75 days); Pink Eye Purple Hull (78 days); Mississippi Silver (80 days).

Description

Black-eyed peas are tender annuals that can be either bushy or climbing plants, depending on the variety. The seeds of the dwarf varieties are usually white with a dark spot (black eye) where they're attached to the pod; sometimes the spots are brown or purple. Black-eyed peas originated in Asia. Slave traders brought them to Jamaica, where they became a staple of the West Indies' diet.

Where and when to grow

Unlike sweet peas, black-eyed peas tolerate high temperatures but are very sensitive to cold — the slightest frost will harm them. They grow very well in the South, but they don't grow well from transplants, and some Northern areas may not have a long enough growing season to accommodate them from seeds. If your area has a long enough warm season, plant black-eyed peas from seed four weeks after the average date of last frost.

How to plant

Black-eyed peas will tolerate partial shade and will grow in very poor soil. In fact, like other legumes, they're often grown to improve the soil. Well-drained, well-worked soil that's high in organic matter increases their productivity. When you're preparing the soil for planting, work in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Sow seeds half an inch deep and about two inches apart in rows two to three feet apart; when the seedlings are large enough to handle, thin them to three or four inches apart.

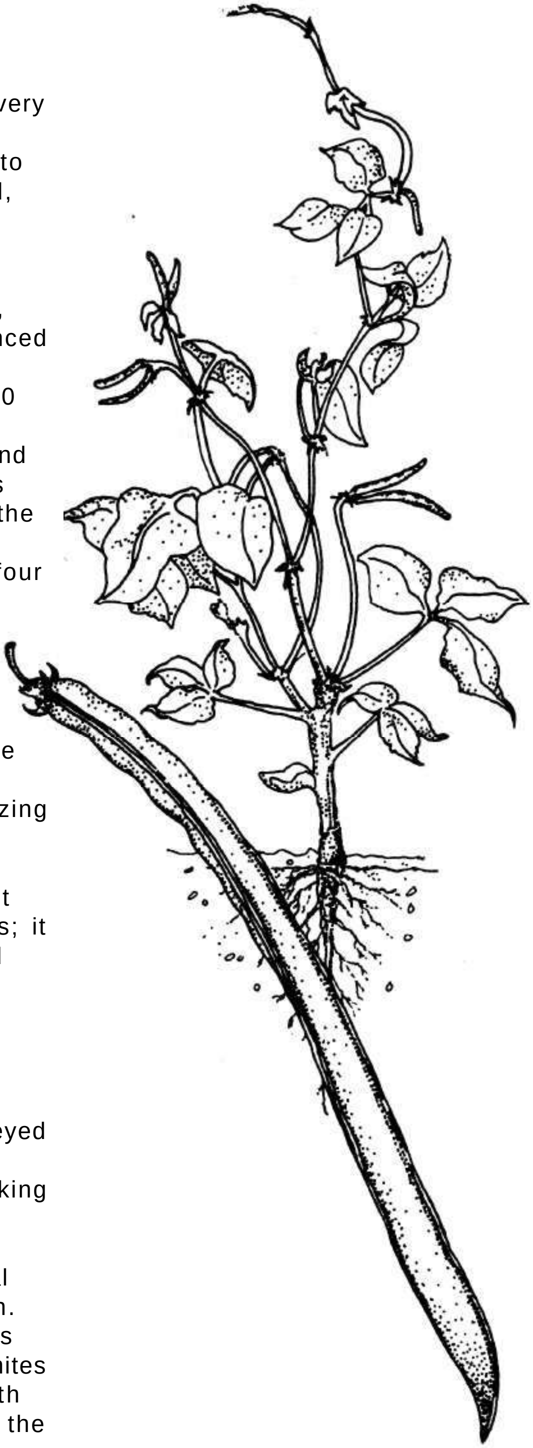
Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Don't let the soil dry out, but try to keep water off the flowers; it may cause them to fall off, and this will reduce the yield.

Pests

Beetles, aphids, spider mites, and leafhoppers attack black-eyed peas. Control aphids and beetles physically by hand-picking or hosing them off the plants, pinch out aphid-infested vegetation, or using a chemical spray of Diazinon or Malathion. Hose leafhoppers off the plants or spray with carbaryl. Spider mites are difficult to control even with the proper chemicals; remove the affected plants before the spider mites spread, or spray the undersides of the foliage with Diazinon. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Parti.



Black-eyed pea

Diseases

Black-eyed peas are susceptible to anthracnose, rust, mildews, mosaic, and wilt. Planting disease-resistant varieties when possible and maintaining the general cleanliness and health of your garden will help cut down the incidence of disease. To avoid spreading disease, don't work with the plants when they're wet. If a plant does become infected, remove it before it can spread disease to healthy plants. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Part 1.

When and how to harvest

Time from planting to harvest is from 70 to 110 days. You can eat either the green pods or the dried peas. Pick pods at whatever stage of maturity you desire — either young and tender or fully matured to use dried.

Storing and preserving

Unshelled black-eyed peas can be kept up to one week in the refrigerator. Young black-eyed peas can be frozen, pod and all; the mature seeds can be dried, canned, or frozen. Dried shelled black-eyed peas can be stored in a cool, dry place for 10 to 12 months. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Eat young black-eyed peas in the pod like snap beans; dry the shelled peas for use in

casseroles and soups. Combine cooked black-eyed peas and rice, season with red pepper sauce, and bake until hot; or simmer the peas with pork or bacon for a classic Southern dish.

Peanut

Common name: peanut
Botanical name: Arachis hypogaea
Origin: South America

Varieties

Few varieties are available. Try either Virginia or Spanish peanuts, whichever is available in your area. If you can find raw peanuts at the grocery store, plant those.

Description

The peanut is a tender annual belonging to the pea family. It grows six inches to *21/2* feet tall, depending on whether it's the bunch type, which grows upright, or the runner type, which spreads out over the ground. Small clusters of yellow, sweet-pea-like flowers grow on stems called pegs. The pegs grow down and push into the soil, and the nuts develop from them one to three inches underground. You can grow a peanut plant indoors if you give it lots of sunlight; it's a novel and entertaining houseplant.

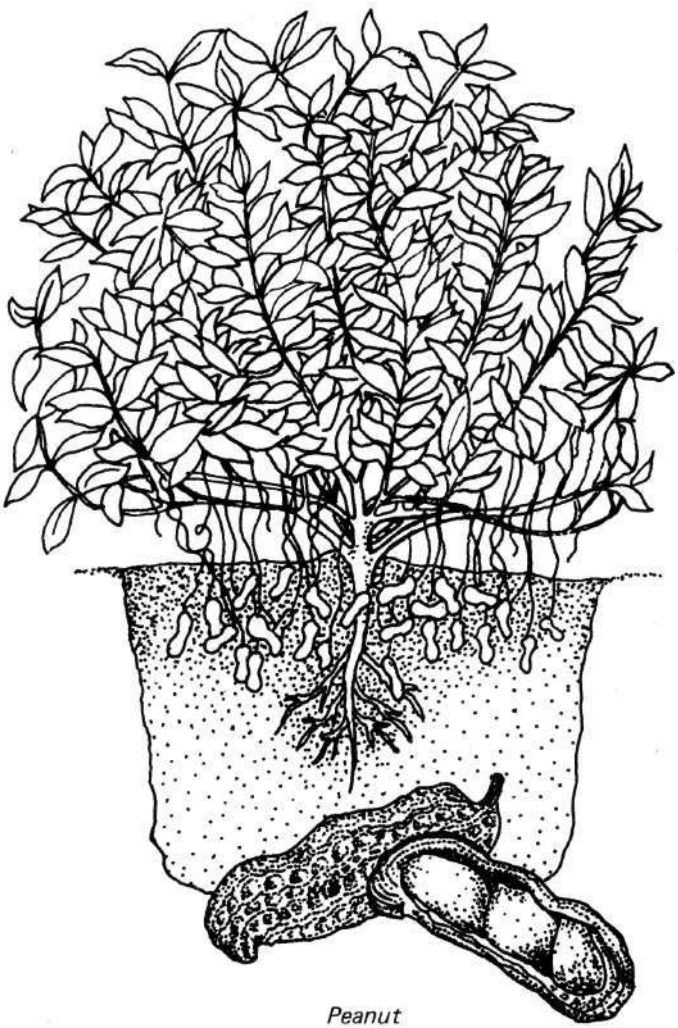
Peanuts are 30 percent protein and 40 to 50 percent oil. George Washington Carver made over 117 separate products out of peanuts.

Where and when to grow

Peanuts need a frost-free growing season four to five months long. They're not grown commercially north of Washington, D.C., but they can be grown for fun much farther north. If your growing season is short, start the peanuts in pots inside, and then transplant them outdoors when the weather warms up. Start them two weeks before your average date of last frost, and transplant them outside two to three weeks after your average date of last frost.

How to plant

Peanuts like well-worked sandy soil that is high in organic matter. The pegs have difficulty



Peanut

penetrating a heavy clay soil. When you're preparing the soil for planting, work in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Plant either shelled raw peanuts or transplants six to eight inches apart, in rows 12 to 18 inches apart. If you're growing from seed, plant the seeds one to three inches deep. Grow them in double rows to save space.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Keep soil moisture even until the plants start to flower, then water less. Blind (empty) pods are the result of too much rain or humidity at flowering time.

Special handling

Use a heavy mulch to keep the soil surface from becoming hard — the peanut pegs will not have to work so hard to become established in the soil. Mulching will also make harvesting easier.

Pests

Local rodents will be delighted that you've become a peanut farmer. Discourage them by removing their hiding places and fencing them out of your garden. Peanuts have no other serious pest problems. In warm climates they are a good crop for the organic gardener. Detailed information on control is given in "Keeping Your Garden Healthy" in Part 1..

Diseases

Peanuts have no serious disease problems.

When and how to harvest

Time from planting to harvest is 120 to 150 days. Your yield depends on the variety of peanut and the weather at the time of flowering, but usually there are not as many peanuts as you might imagine. Start harvesting when the plants begin to suffer from frost. Pull up the whole plant and let the pods dry on the vine.

Storing and preserving

Shelled peanuts can be sprouted, frozen, or used for peanut butter, or roasted for snacks. Dried shelled peanuts can be stored in a cool, dry place for 10 to 12 months. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

You probably won't be able to resist eating your peanuts as snacks, but if you've got lots, make peanut butter. Run the nuts through a meat grinder for crunchy peanut butter; for the smooth kind put them in the blender. And imagine homemade peanut butter cookies with homegrown peanuts — you'll be one up on everyone at the school bazaar. Add peanuts and candied orange peel to a fudge recipe — it makes a delicious crunchy candy.

Peanut seedling

Pepper

Common names: pepper, bell pepper, sweet pepper, hot pepper, wax pepper, chili pepper, pimento
Botanical names: Capsicum frutescens (hot pepper), Capsicum annuum (sweet and hot peppers)
Origin: New World tropics

Varieties

Peppers come in bell (sweet) or hot varieties. The bell peppers are the most familiar; most are sweet, but there are a few hot varieties. They're usually harvested when green, but will turn red (or occasionally yellow) if left on the plant. Hot peppers — sometimes called chili peppers — are intensely flavored, and there are more than a hundred varieties. Ask your Cooperative Extension Service for specific recommendations for your area.

The following are reliable varieties for general use; the initials TM indicate resistance to tobacco mosaic disease. **Bell (sweet) peppers:** Bell Boy (TM, 75

control aphids with Malathion or Diazinon, and flea beetles with carbaryl. Carbaryl can also be used to control cutworms; apply it to the base of the plants. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Part 1.

Diseases

Pepper plants are susceptible to rot, blossom end rot, anthracnose, tobacco mosaic virus, bacterial spot, and mildew. Planting disease-resistant varieties and maintaining the general cleanliness and health of your garden will help cut down the incidence of disease. If a plant does become infected, remove it before it can spread disease to healthy plants. If you smoke, wash your hands before working with the plants to avoid spreading tobacco mosaic virus. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Part 1.

When and how to harvest

If you want sweet red peppers, leave your sweet green peppers on the vine until they ripen and turn red. Cut the peppers off the vine; if you pull them off half the plant may come up with the fruit. Hot peppers can irritate skin, so wear gloves when you pick them.

Storing and preserving

Peppers will keep up to one week in the refrigerator or for two to three weeks in a cool, moist place. Sweet or hot peppers can be pickled whole or in pieces, or they can be chopped and frozen or dried. Whole peppers can be strung up to dry — a wreath of hot peppers makes a great kitchen decoration. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Stuffed, raw, pickled, or roasted, sweet and hot peppers add lively flavor to any meal. Stuff sweet peppers with tuna, chicken, a rice and meat mixture, or chili con carne. For a vegetarian dish, stuff them with rice and chopped vegetables, a cheese mixture, or seasoned breadcrumbs. Stuff raw peppers with cream cheese, slice into rings, and serve in a salad. Use thick rings in a dish of vegetables for tempura. French-fry peppers, or fry them Italian-style in oil and garlic. Use chopped peppers in chili and spaghetti sauce recipes, and add a spoonful of chopped hot pepper to a creamy corn soup for an interesting flavor contrast.

When you're preparing raw hot peppers, cut and wash them under running water and wash your hands well when you're finished. Avoid rubbing your eyes while handling hot peppers. Milk is more soothing than water for washing the hot pepper's sting from your skin.

Potato

Common names: potato, white potato, Irish potato
Botanical name: Solanum tuberosum
Origin: Chile, Peru, Mexico

Varieties

There are more than 100 varieties of potatoes in the United States, and they fall into four basic categories: long whites, round whites, russets, and round reds. The most important variety is Russet Burbank, but it does not grow successfully in all areas. Good white varieties for general use are Irish Cobbler (75 days) and Norchip (90 days). Good red varieties for general use are Norland (75 days) and Red La Soda (110 to 120 days). Because there are so many varieties, and the results you get will vary according to growing conditions in your area, ask your Cooperative Extension Service for specific recommendations for your area.

Description

The potato is a perennial grown as an annual. It's a weak-stemmed plant with hairy, dark green compound leaves that look a little like tomato leaves, and it produces underground stem tubers when mature. The potato is a member of the solanaceous family, and is related to the tomato, the eggplant, and the pepper; it originated at high altitudes and still prefers cool nights.

Potatoes haven't always been as commonplace as they are now. They grew in temperate regions along the Andes for a couple of thousand years before Spanish explorers introduced them to Europe in the 16th century. To encourage the growing of potatoes, Louis XVI of France wore potato flowers in his buttonhole, and Marie Antoinette wore a wreath of potato flowers in her hair to a ball. But the people didn't become

interested in potatoes until an armed guard was assigned to watch the royal potato patch.

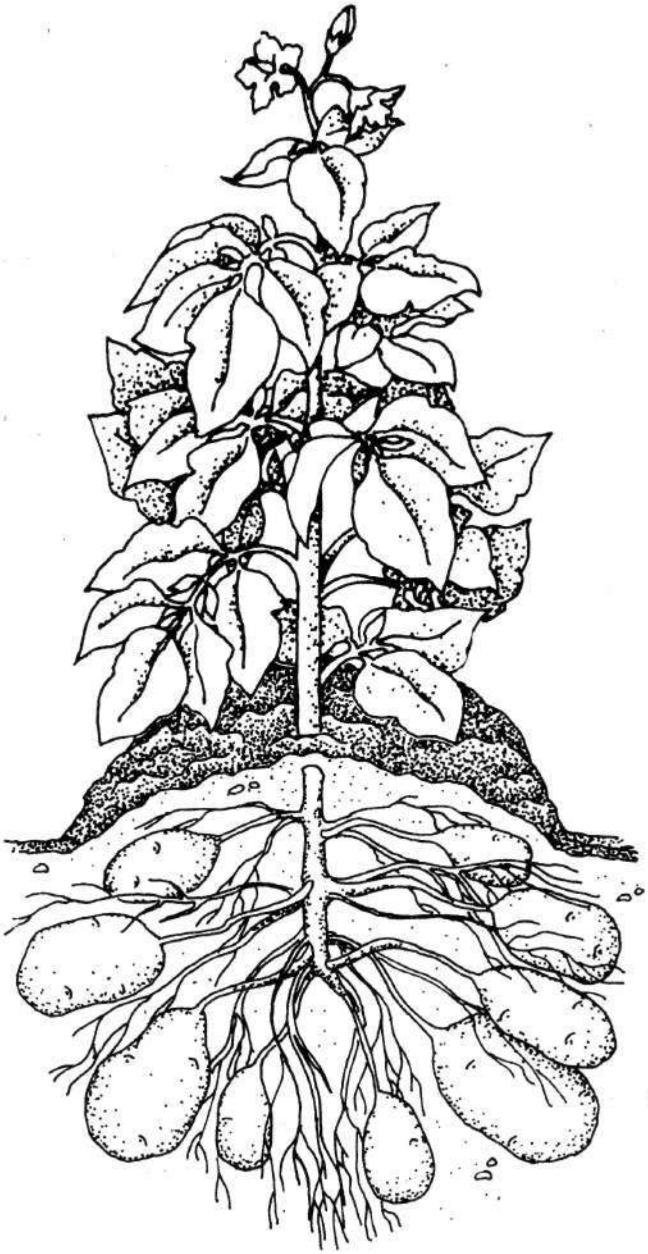
Where and when to grow

Potatoes need a frost-free growing season of 90 to 120 days. They're a cool- weather crop, and they grow best in areas with a fairly cool summer; the ideal potato-growing temperature is 60° to 70°F. Hot weather cuts down on the production of tubers. Grow potatoes in summer in the North, and in fall, winter, and spring in the South. Plant early varieties just before your average date of last frost, and plant fall crops 120 days before the average date of the first fall frost. If your season is short, plant as soon as possible for a late crop.

How to plant

Potatoes are grown from whole potatoes or pieces of potatoes — these are called seed pieces; each piece must have at least one eye. Always plant certified disease-free seed pieces, and don't try to use supermarket potatoes, which have been chemically treated to prevent sprouting. Some suppliers are experimenting with potatoes grown from actual seed, but these have yet to prove themselves, and the use of potato seed is not recommended at this stage.

Potatoes need well-drained fertile soil, high in organic matter, with pH of 5.0 to 5.5. Adding lime to improve the soil and reduce acidity usually increases the size of the crop, but it also increases the incidence of scab — a condition that affects the skin of the potato but not the eating quality. When you're preparing the soil for planting, work in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Plant potatoes or potato pieces in full sun, four inches deep, 12 to 18 inches apart, in rows 24 to 36 inches apart. You can also plant in a trench or on top of the ground and cover them with a thick mulch, such as 12 Inches of straw or hay. For a very compact plant,



Potato

Potato seedling

you can grow potatoes in barrels, old tires, or large bags — as the plant grows you add layers of soil to cover the leaves and stems. This encourages the plant to produce new tubers.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

For the best production, try to maintain even soil moisture; watering before the soil dries out. A thick mulch will conserve soil moisture, keep down weeds, and keep the soil from getting too warm.

Pests

Colorado potato bugs, leafhoppers, flea beetles, and aphids attack potatoes. Spray Colorado potato bugs, leafhoppers and flea beetles with carbaryl. Spray aphids with Malathion. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Part 1. Potatoes have so many pest problems they may not be a good choice for the organic gardener.

Diseases

Potatoes are susceptible to blight and to scab, which causes a curly roughness of the skin but does not affect the eating quality of the potato. Plant resistant varieties for the best results, especially for large plantings, and use seed certified as true to type and free of disease. Maintaining the general health and cleanliness of your garden will also lessen the incidence of disease. If a plant does become infected, remove and destroy it to avoid spreading disease to healthy plants. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Parti.

When and how to harvest

Time from planting to harvest is 75 to 130 days, and a 10-foot row will give you eight to 10 pounds of potatoes. Each plant will probably produce three to six regular-size potatoes and a number of small ones. Potatoes are fun to grow, and the young new potatoes are delicious. Dig up new potatoes after the plant blooms, or if it doesn't bloom, after the leaves start to yellow. For potatoes that taste like store-boughtones, dig up the tubers two weeks after the vine dies in fall. Use a spading fork to dig the potatoes, and be as gentle as possible to avoid bruising or damaging the skins.

Storing and preserving

Cure potatoes in a dark, humid place for 10 days at 60° to 65°F; then store them in a cold, moderately moist place for four to six months. Be careful not to let them get wet, or they'll rot. Do not refrigerate them. Prepared or new potatoes freeze well and potatoes can also be dried. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Potatoes are wonderfully versatile in the kitchen — you can boil, bake, roast, fry, puree, saute, and stuff them. The enterprising cook can serve a different potato dish every day for a month. Small new potatoes are delicious boiled and tossed in butter and parsley or mint; don't peel them. Stuff potatoes with tuna and spinach for a nourishing all-in-one dish. Enjoy low-calorie fries by brushing the fries all over with oil and baking them in a single layer on a cookie sheet. Pipe pureed potatoes around the edge of a dish for an elegant garnish. Add cubed, cooked potatoes with other vegetables to an omelette or frittata. Don't throw away potato skins — they're full of goodness. Deep fry them, or simmer them to make stock. When you're mashing potatoes use hot milk, not cold — they'll be lighter and fluffier; a teaspoon of baking powder will have the same effect.

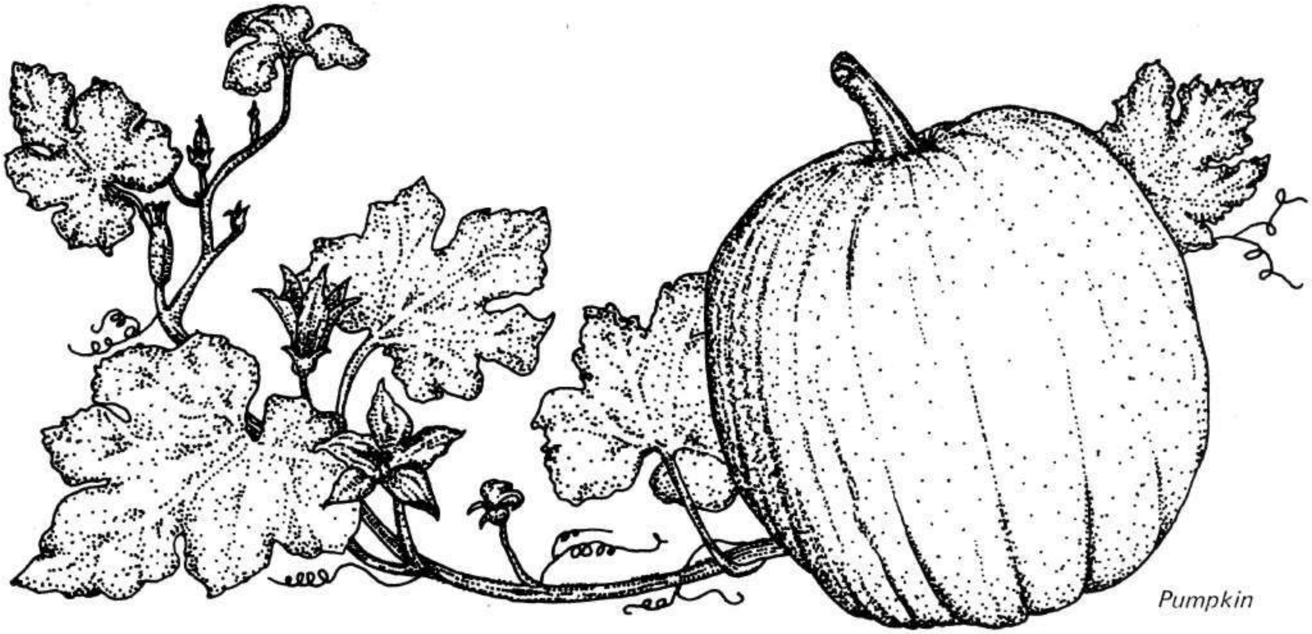
A nonedible use for potatoes: Cut a potato in half, and carve a picture or design on the cut surface; ink it, and press on paper for an instant block print. It's a splendid way of keeping the children busy on a wet afternoon.

Potato, sweet

See **Sweet potato**

Pumpkin

Common name: pumpkin
Botanical names: Cucurbita maxima, Cucurbita moschata, Cucurbita pepo
Origin: tropical America



Pumpkin

Varieties
Small pumpkins are grown primarily for cooking; intermediate and large sizes for cooking and for making jack-o'-lanterns; and the very large jumbo ones mainly for exhibition. The bush and semi-vining varieties are best suited to small home gardens. The following are a few of the varieties available, and unless otherwise indicated they are the vining kind. Ask your Cooperative Extension Service for other specific recommendations for your area. **Small (four to six pounds, 100-110 days):** Early Sweet Sugar; Luxury; Spookie; Sugar Pie. **Intermediate (eight to 15 pounds, 100-110 days):** Cinderella (bush); Green-Striped Cushaw; Jack-O'-Lantern; Spirit (semi-vining). **Large (15 to 25 pounds, 100 days):** Big Tom; Connecticut Field; Halloween; White Cushaw. **Jumbo (50 to 100 pounds, 120 days):** Big Max; King of the Mammoths.

Description

Pumpkins are tender annuals with large leaves on branching vines that can grow 20 feet long. The male and female flowers — sometimes as large as eight inches in diameter — grow on the same vine, and the fruit can weigh as much as 100 pounds. The name pumpkin is also given to a number of other squashes and gourds — anything that's orange and hard. The harvest poem reference, "when the frost is on the pumpkin," means the first light frost, not a hard freeze. The first pumpkin pies were made by pouring milk into a pumpkin and baking it.

Where and when to grow

Pumpkins need a long growing season; they will grow almost anywhere in the United States, but in cooler areas you'll do better with a smaller variety. Pumpkins are sensitive to cold soil and frost. Plant them from seed two to three weeks after your average date of last frost when the soil has warmed up. Pumpkins are relatively easy to grow so long as you have space to accommodate them. They're not the vegetable to grow in a small home garden, although you can train them on afence or trellis, and the bush type requires less space than the vining varieties.

How to plant

Pumpkins can tolerate partial shade and prefer well-drained soil, high in organic matter. Too much fertilizer tends to encourage the growth of the vines rather than the production of pumpkins. When you're preparing the soil for planting, work in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Plant pumpkins in

inverted hills, made by removing an inch of soil from a circle 12 inches in diameter and using the soil to build up a rim around the circle; leave six feet betv^een hills. Plant six to eight seeds in each hill, and thin to two or three when the seedlings appear. When the seedlings have four to six true leaves, thin to only one plant in each hill. Cut off the thinned seedlings at soil level to avoid disturbing the roots of the chosen survivor. One early fruit can suppress the production of any more pumpkins. Some people suggest removing this first pumpkin, but this is a gamble because there's no guarantee that others will set. If you remove it, eat it like squash.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Be generous with water; pumpkins need plenty of water to keep the vines and fruit growing steadily.

Pests

Squash vine borers attack pumpkins, and if the plant is wilting it may be that borers are to blame. Prevention is better than cure with borers, because once the pest is inside the plant, chemical controls won't help. IT you suspect borers are at work, apply carbaryl to the crown of the plant at weekly intervals. If the vine wilts from a definite point onward, look for a very thin wall or hole near the point where the wilting starts. The culprit may still

Pumpkin seedling

be there, but you may still be able to save the plant. Slit the stem, remove the borer and dispose of it, then cover the stem with soil to encourage rooting at that point. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Part 1.

Diseases

Pumpkins are susceptible to mildew, anthracnose, and bacterial wilt. Planting disease-resistant varieties when possible, maintaining the general cleanliness and health of your garden, and not handling the vines when wet will help cut down the incidence of disease. If a plant does become infected, remove it before it can spread disease to healthy plants. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Part 1.

When and how to harvest

Time from planting to harvest is 95 to 120 days. A 10-foot row may give you one to three pumpkins — when you're talking pumpkins, your back yard starts to look like small potatoes. Leave the pumpkins on the vine as long as possible before a frost, but not too long — they become very soft when they freeze. Cut off the pumpkin with one or two inches of stem.

Storing and preserving

Cure pumpkins in a dark, humid place for 10 days at 80° to 85°F; then store them at 50° to 55°F, in a dry place for three to six months. Do not refrigerate. Stored pumpkins will shrink as much as 20 percent in weight; they'll still make good pies, but they look sad if kept too long. You can dry or pickle pumpkin, or freeze or can the cooked pulp. You can also sprout pumpkin seeds. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Spice up the cooked pumpkin flesh for pie fillings, breads, or muffins; or use it in custards, or as a stuffing for meats or vegetables. Roast the seeds for a nutritious snack. If a pumpkin has served only briefly as a jack-o'-lantern, you can still use the flesh for cooking.

Radish

Common name: radish
Botanical name: Raphanus sativus (spring radish), Raphanus sativus longipinnatus (winter radish)
Origin: temperate Asia

Varieties

Radishes can be grown for a spring or winter crop. Spring varieties are the commonly known small red varieties. Winter radishes are larger and more oval and can grow eight or nine

inches long. The following are a few of the varieties available. **Spring crop:** Cherry Belle (22 days); Burpee White (25 days). **Winter crop:** Black Spanish (55 days); White Chinese (60 days).

Description

Radishes are hardy annuals or biennials that produce white, red, or black roots and stems under a rosette of lobed leaves. They're fun to grow, and youngsters get hooked on gardening after growing radishes more than any other vegetable. A bunch of radishes, well washed, makes a great posy to give away. Radishes are distant relations to horseradish.

Where and when to grow

Radishes are cool-season crops and can take temperatures below freezing. You can grow them anywhere in the United States, and they mature in such a short time that you can get two to three crops in spring alone. Start planting them from seed in the garden two or three weeks before the average date of last frost for your area. Radishes germinate quickly and are often used with slower-growing seeds to mark the rows. Spring radishes produce a crop so fast that in the excitement very few people ask about the quality of the crop. Radishes can also be grown in six-inch pots in a bright, cool window. They will grow in sand if watered with liquid, all-purpose fertilizer diluted to quarter strength.

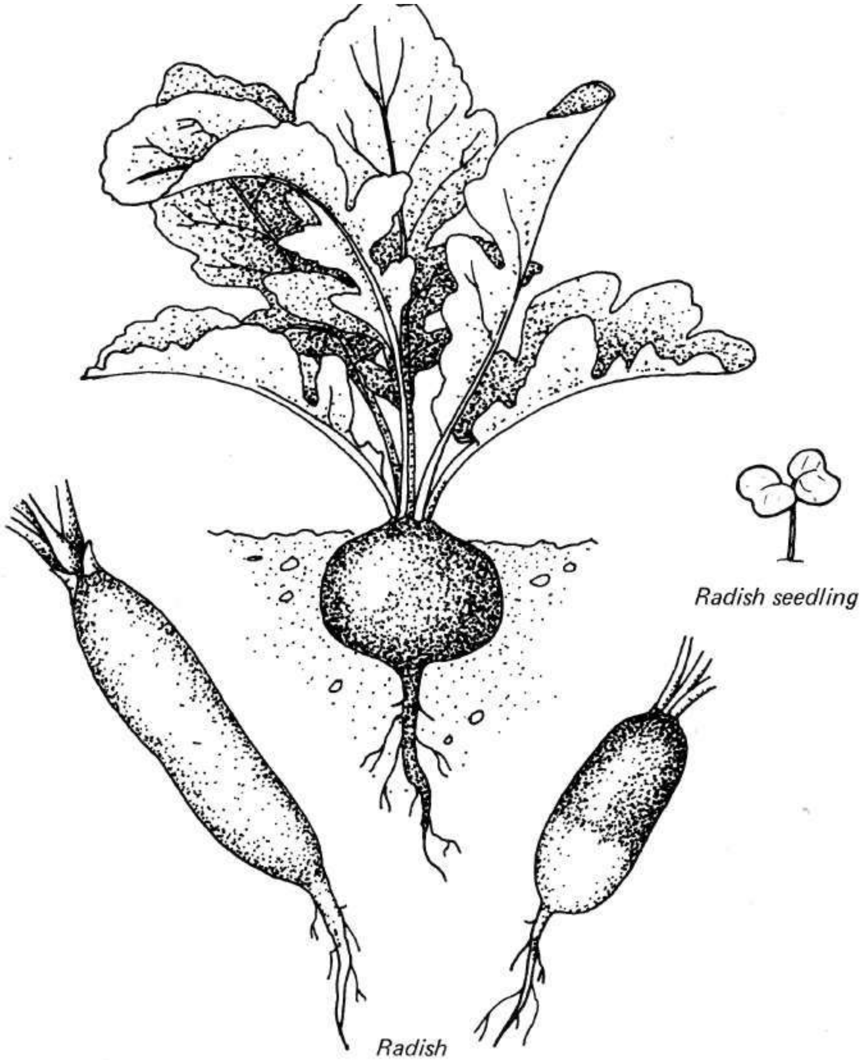
How to plant

Radishes tolerate partial shade and like well-worked, well-drained soil. When you're preparing the soil for planting, work in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. If you're planting winter radishes, be sure to loosen the soil well and remove soil lumps or rocks that might cause the roots to become deformed. Plant seeds half an inch deep in rows or wide rows 12 to 18 inches apart. When the seedlings are large enough to handle, thin them according to the variety; thin small spring varieties one to three inches apart, and give winter varieties a little more space.

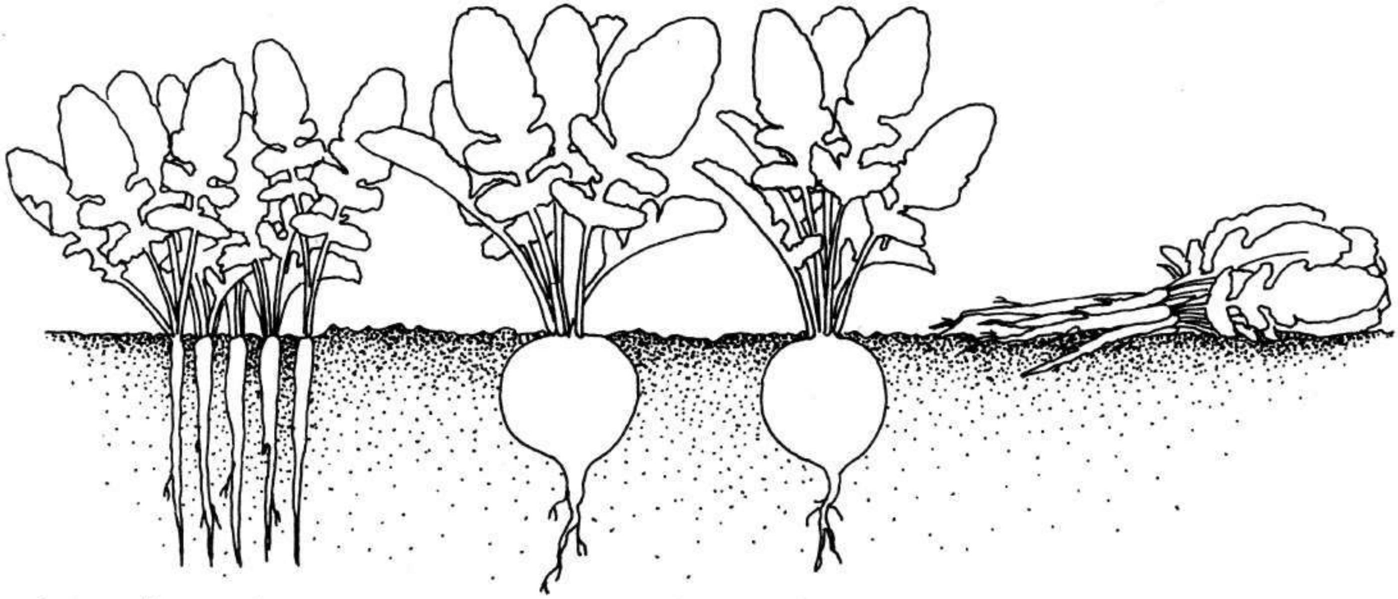
Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Give radishes enough water to keep the roots growing quickly.



Radish



Overcrowding can ruin your root vegetable crops; thin radishes so that the roots have room to develop.

If the water supply is low, radishes become woody.

Special handling

Radishes sometimes bolt, or go to seed, in the summer, but this is more often a question of day length than of temperature. Cover the plants in midsummer so they only get an eight-hour day; a 12-hour day produces flowers and seeds but no radishes.

Pests

Aphids and root maggots occasionally attack radishes, but you harvest radishes so quickly that pests are not a serious problem. You can pinch out aphid-infested foliage, and drench the soil around the plants with Diazinon to control root maggots. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Part 1.

Diseases

Radishes have no serious disease problems.

When and how to harvest

Time from planting to harvest is 20 to 30 days for spring radishes, 50 to 60 days for winter radishes. Pull up the whole plant when the radishes are the right size. Test-pull a few or push the soil aside gently to judge the size, and remember that the biggest radishes aren't necessarily the best. If you wait too long to harvest, the centers of spring radishes become pithy.

Storing and preserving

Radishes will store for one to two weeks in the refrigerator. You can also sprout radish seeds. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Radishes can be sculptured into rosettes or just sliced into a salad. They are low in calories and make good cookie substitutes when you have to nibble. Put radishes on a relish tray, or on a platter of vegetables for dipping. Try "pickling" the excess crop by mincing them and marinating in vinegar.

Rhubarb

Common names: rhubarb, pie plant
Botanical name: Rheum rhaponticum
Origin: southern Siberia

Varieties

Canada Red; MacDonald; Valentine; Victoria (green stalks).

Description

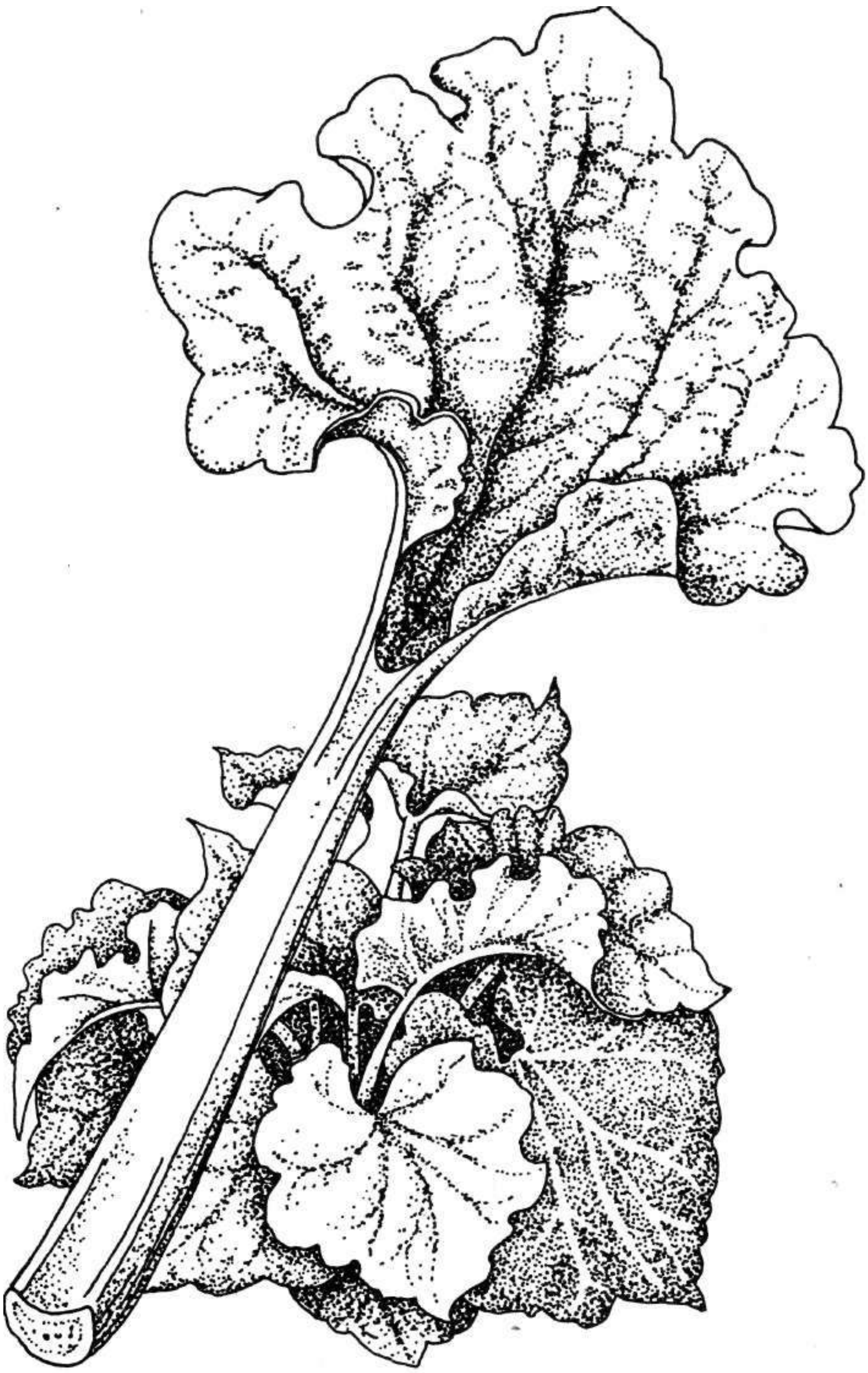
A hardy perennial, rhubarb grows two to four feet tall, with large, attractive leaves on strong stalks. The leaf stalks are red or green and grow up from a rhizome or underground stem, and the flowers are small and grow on top of a flower stalk. Don't allow the plant to reach the flowering stage; remove the flower stalk when it first appears. You eat only the rhubarb stalks; the leaves contain a toxic substance and are not for eating.

Where and when to grow

Rhubarb is very hardy and prefers cool weather. In areas where the weather is warm or hot, the leaf stalks are thin and spindly. Rhubarb can be grown from seed, but the plants will not grow "true" — which means they won't be the same variety as the parent plant. Crow from the divisions that grow up from the parent stems for a close or exact copy of the parent plant. Buy divisions or divide your own plants in spring, about four to six weeks before the average date of last frost. The timing is not crucial, because you won't harvest rhubarb the first year. Refer to "Planting Your Garden" in Part 1 for information on dividing plants.

How to plant

Rhubarb likes rich, well-worked soil that is high in organic matter and drains well. Give it a place in full sun or light shade. When you're preparing the soil for planting, work in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet.



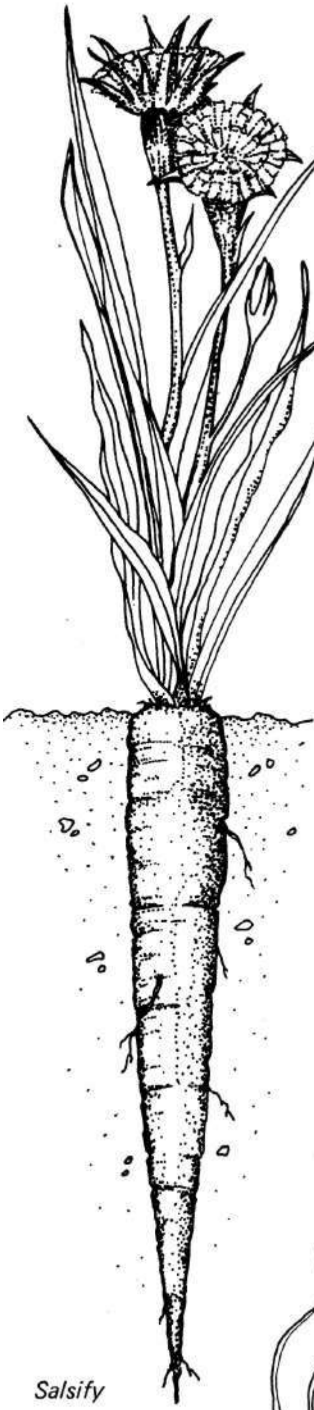
Rhubarb

you're ready to use them; in very cold areas, mulch them heavily. Store rutabagas in a cold, moist place for two to four months; do not refrigerate. They can also be frozen. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Peel rutabagas and steam or boil until tender; then mash them for use in puddings and pancakes. They can also be served sliced or diced. Add rutabagas to vegetable soups and stews. Saute them in butter with apples and brown sugar. Rutabaga is very good with lots of butter or sour cream; low-calorie alternatives are yogurt or low-fat cream cheese.

Salsify



Salsify

Salsify seedlings

Common names: salsify, oyster plant
Botanical name: Tragopogon porrifolius
Origin: southern Europe

Varieties

Few varieties are available; grow the variety available in your area.

Description

Salsify is a hardy biennial grown as an annual. It's related to dandelion and chicory, and its flowers look like lavender chicory blossoms. The edible part is the long taproot. This salsify should not be confused with black salsify (Scorzonera hispanica) or Spanish salsify (Scolymus hispanicus); both of these are related to the radish. Some people claim that salsify has a slight oyster flavor — hence the name "oyster plant." In fact, it tastes rather like artichoke hearts.

Where and when to grow

Salsify is hardy and tolerates cold. Like its prolific cousin, the dandelion, it's very easy to grow and will grow anywhere in the United States. Plant salsify from seed two or three weeks before your area's average date of last frost.

How to plant

Plant salsify seeds in full sun in rich, well-worked soil. When you're preparing the soil for planting, work in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Work the soil thoroughly to a depth of eight to 12 inches, and remove all stones, soil lumps, or rocks that might cause the roots to fork and split. Plant the seeds half an inch deep in rows 18 to 24 inches apart, and when the seedlings are large enough to handle, thin them to stand two to four inches apart.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Don't overfertilize salsify; it will cause the roots to fork and split. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Keep salsify evenly moist to

prevent the roots from getting stringy.

Pests

Salsify has no serious pest problems.

Diseases

Salsify has no serious disease problems.

When and how to harvest

Time from planting to harvest is about 120 days, and a 10-foot rov^ should yield 20 to 40 roots. Salsify roots can take freezing, so leave them in the ground as long as possible until you want them. The longer they're out of the ground, the less they taste like oysters. To harvest, dig up the whole root.

Storing and preserving

Cut the tops off salsify and store the roots in the refrigerator for one to three weeks, or store in a cold, moist place for two to four months. For freezing, handle salsify like parsnips. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Salsify roots should not be peeled before cooking; they can "bleed'." Scrub them clean, steam, and slice them, then dip the slices in batter or breadcrumbs and fry; serve with tartar sauce. People who have never had oysters can't tell them apart. Try salsify braised with lemon and butter — the lemon helps preserve the color. Or serve it with a white sauce; add chopped parsley for color.

Shallot

Common name: shallot
Botanical name: Allium cepa
Origin: Asia

Varieties

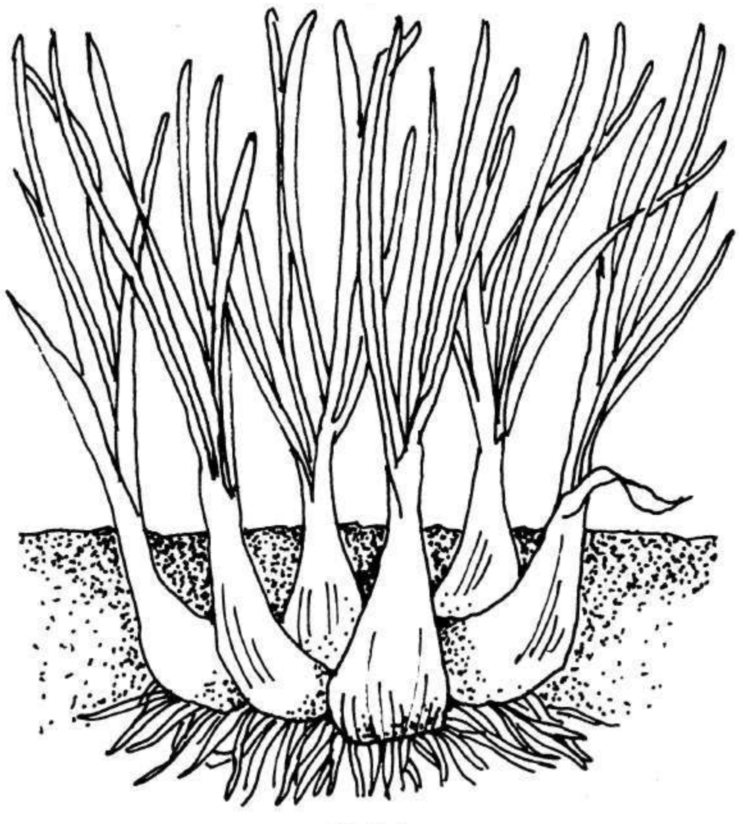
Few varieties are available; grow the variety available in your area.

Description

The shallot is a very hardy biennial grown as an annual, and it's a member of the onion family. It's believed that French knights returning from the Crusades introduced them to Europe, and that De Soto brought them to America in 1532. Shallot plants grow about eight inches tall in a clump, with narrow green leaves, and look very much like small onions; they're favorites with gourmets. The roots are very shallow and fibrous, and the bulbs are about a half inch in diameter when mature. The small bulbs have a more delicate flavor than regular onions. Use the young outer leaves like chives.

Where and when to grow

Shallots are easy to grow and very hardy. You can grow them anywhere in the United States from cloves planted early in spring.



Shallot

How to plant

Shallots can be grown in any soil but may have less flavor when they're grown in clay soils. Shallots are very shallow-rooted plants and need little soil preparation. Although they prefer full sun, they'll survive in partial shade. Shallots seldom form seed, so they're usually grown from cloves, which should be planted four to six weeks before your average date of last frost. When you're preparing the soil for planting, work in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Plant the cloves six to eight inches apart in rows 12 inches apart, and set them so that the tops of the cloves are even with the soil, but no deeper. Keep them carefully cultivated when they're small; the shallow root systems don't like to compete with weeds.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Water the shallots regularly; do not allow the soil to dry out.

Pests

Shallots have no serious pest problems.

Diseases

Shallots have no serious disease problems.

When and how to harvest

Cut the green shallot leaves throughout the growing season, but be careful not to cut away any new growth coming from the central stem. Dig up bulbs when the tops wither and fall over.

Storing and preserving

Store shallots in the refrigerator for up to one week or store the bulbs like onions in a cold, dry place for two to eight months. You can also freeze or dry them like onions. The greens can be chopped and frozen like chives. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Shallots have a delicate flavor and are less overpowering than many onions. They're very good stirred into sour cream as a dressing for vegetables or fish, or chopped and added to an oil-and-vinegar dressing for salads. Use the small bulbs in the classic French beef stew, *boeuf bourguignonne.*

Snap bean,

See **Bean, green or snap**

Sorrel

Common names: garden sorrel, herb patience or spinach dock, French sorrel, spinach rhubarb.

Botanical name: Rumex acetosa, Rumex patientia, Rumex scutatus, Rumex abyssinicus.

Origin: Europe

Varieties

Few varieties are available commercially; grow the variety available in your area. Garden sorrel, French sorrel, and herb patience or spinach dock are all good for eating.

Description

Several varieties of sorrel will do well in your garden. Garden sorrel (R. acetosa) grows about three feet tall and produces leaves that are good used fresh in salads; herb patience or spinach dock (R. patientia) is a much taller plant, with leaves that can be used either fresh or cooked. French sorrel (R. scutatus) grows only six to 12 inches tall; its fiddle-shaped leaves make good salad greens. Spinach rhubarb (R. abyssinicus) is a lofty plant— it grows up to eight feet tall. As the name suggests, you can cook the leaves like spinach and the stalks like rhubarb. Avoid other varieties — they're weeds and not good for eating.

Where and when to grow

All the sorrels are very hardy and can be grown in almost every area of the United States. Start them from seed in the early spring before your average date of last frost.

How to plant

All the sorrels require a sunny location with well-drained, fertile soil. When you're preparing the soil, dig in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 feet. Plant sorrels from seed two to three weeks before the average date of last frost. Plant the seeds a half

inch deep in rows 18 to 24 inches apart, and when the plants are six to eight weeks old, thin them to 12 to 18 inches apart.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Part 1.

Sorrel plants should be kept moist; water them more often than the rest of the garden.

Pests

Aphids will probably show interest in your sorrel. Control them by pinching out infested areas or hosing the aphids off the plants; or spray with Malathion or Diazinon. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Part 1.

Sorrel

Diseases

Sorrel has no serious disease problems.

When and how to harvest

Pick the fresh leaves of the sorrel throughout the growing season. Pick off the flowers before they mature to keep the plants producing new leaves long into the fall.

Storing and preserving

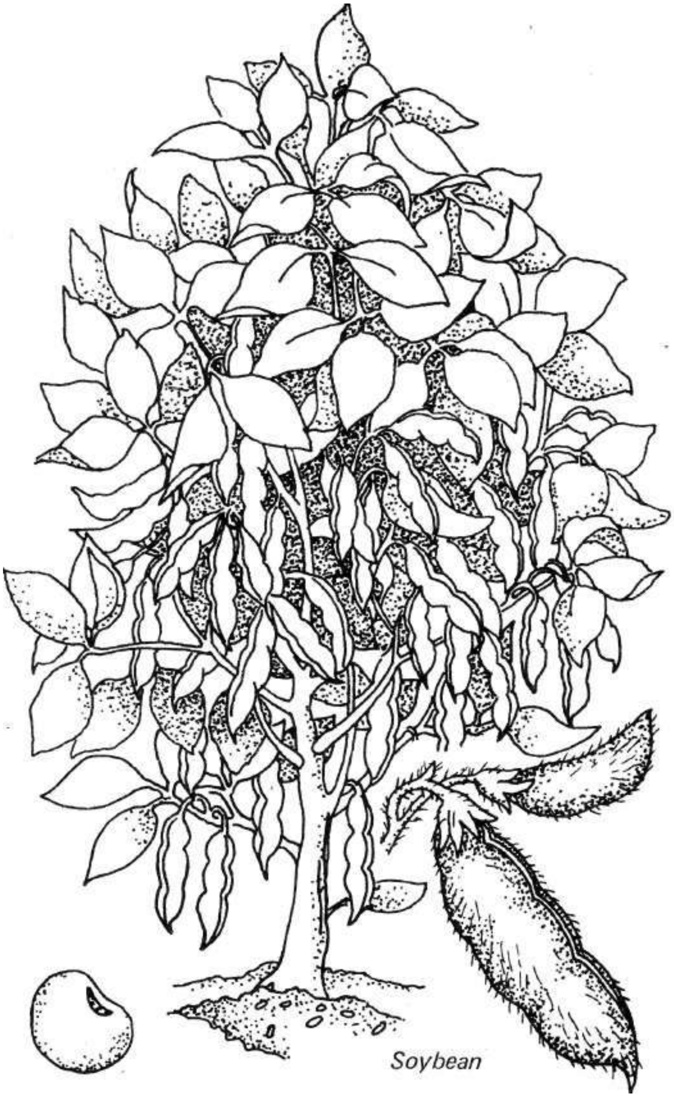
Use sorrel fresh, or store sorrel leaves in the refrigerator for one to two weeks. You can also freeze or dry the leaves as herbs, but you'll lose some flavor. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

You can use sorrel leaves raw, as salad greens or very lightly steamed or boiled and tossed in butter. Sorrel soup is a classic French favorite, and the Russians use sorrel in a green borscht soup. In the time of Henry VIII, sorrel was used as a spice and to tenderize meat. The English also mashed the leaves with vinegar and sugar as a dressing for meat and fish — hence the name green sauce.

Soybean

Common name: soybean
Botanical name: Glycine max
Origin: East Asia



Soybean

Varieties

A number of varieties have been bred to adapt to certain types of climate. Ask your Cooperative Extension Service for specific recommendations for your area.

Description

The soybean is a tender, free-branching annual legume. Though it can grow five feet tall, it's usually only two to 3y2 feet tall. The stems and leaves are hairy; the flowers are white with lavender shading, and the pods are one to four inches long and grow in clusters. The soybean is extremely high in protein and calcium and is a staple of a vegetarian diet. It's also very versatile and can be used to make milk, oil, tofu, or a meat substitute. The ancient Chinese considered the soybean their most important crop. The United States now produces about 75 percent of the world's soybeans.

Where and when to grow

Soybeans are sensitive to cold and most varieties have a narrow latitude range in which they will mature properly and produce a good crop. Plant a variety suited to your area about two to three weeks after the average date of last frost. Don't plant before the soil has warmed up.

How to plant

After the last frost is over, choose a bed in full sunlight; soybeans tolerate partial shade, but partial shade tends to mean a partial yield. Prepare the soil by mixing in a pound of 5-10-10 fertilizer — don't use a high-nitrogen fertilizer, because too much nitrogen will promote growth of foliage but not of the beans. Work the fertilizer into the soil at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. The seeds may crack and germinate poorly when the moisture content of the soil is too high. Don't soak the seeds before planting, and don't overwater immediately afterwards.

Plant seeds an inch deep, one to two inches apart in rows 24 to 30 inches apart. When the seedlings are growing well, thin the plants to two inches apart. Cut the seedlings with scissors at ground level; be careful not to disturb the others. Soybeans don't mind being a little crowded; in fact, they'll use each other for support.

Fertilizing and watering

Soybeans set up a mutual exchange with soil microorganisms called nitrogen-fixing bacteria, which

help them produce their own fertilizer. Some gardeners recommend that if you haven't grown soybeans or beans in the plot the previous season, you should treat the seeds before planting with a nitrogen-fixing bacteria inoculant to help them convert organic nitrogen compounds into usable organic compounds. This is a perfectly acceptable practice, but it isn't really necessary; the bacteria in the soil will multiply quickly enough once they've got a growing plant to work with.

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Keep the soil moist until the soybeans have pushed through the ground. Water regularly if there's no rain, but remember that water on the flowers can cause the flowers and small pods to fall off. When the soil temperature reaches 60°F you can mulch to conserve moisture.

Special handling

Don't handle soybean plants when they're wet or covered with heavy dew; handling or brushing against them when they're wet spreads fungus spores. Cultivate thoroughly but with care, so that you don't disturb the plants' shallow root systems.

Pests

Soybeans do not have many pest problems, unless you're growing them in an area where soybeans are produced commercially. Flea beetles may appear; hand-pick or hose them off the vines, or spray with carbaryl. Rabbits, raccoons, and woodchucks love soybeans and can be strong competitors for your crop. Discourage them by removing places where they can nest or hide or by fencing them out of your garden. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Parti.

Diseases

Soybeans have no serious disease problems.

When and how to harvest

Time from planting to harvest is 45 to 65 days, and a 10-foot row will supply one to two pounds of beans. The yield is not generous, so except for novelty value, soybeans are not the ideal crop for a small home garden. Harvest when the pods are about four inches long or when they look plump and full.

Storing and preserving

Store fresh unshelled soybeans in the refrigerator up to one week. Shelled soybeans can be frozen, canned, or dried. They can also be sprouted. Dropping the pods into boiling water for a minute or two makes shelling easier. Dried, shelled soybeans can be stored in a cool, dry place for 10 to 12 months. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

The Japanese cook soybeans in salted water, serve them in the shell, and then squeeze out the seeds and eat them. Soybeans are extremely versatile; they can be made into oil, milk, or tofu — a major foodstuff among vegetarians. Soybeans are also used as a high-protein meat substitute or ground into flour. Soybeans supply about half the vegetable fats and oils used in this country.

Spinach

Common name: spinach
Botanical name: Spinacia oleracea
Origin: Asia

Varieties

Spinach: Bloomdale Longstanding (43 days); America (52 days). **New Zealand Spinach:** Only a few varieties of New Zealand spinach are available; use the variety available in your area.

Description

There are two kinds of spinach — the regular kind which is a hardy annual, and the less well-known New Zealand spinach, which is a tender annual and is not really spinach at all. Spinach, the regular kind, is a hardy annual with a rosette of dark green leaves. The leaves may be crinkled (savoy leaf) or flat. Spinach is related to beets and chard. The cartoon character Popeye made spinach famous with young children because he attributed his great strength to eating spinach — probably with some justification, because

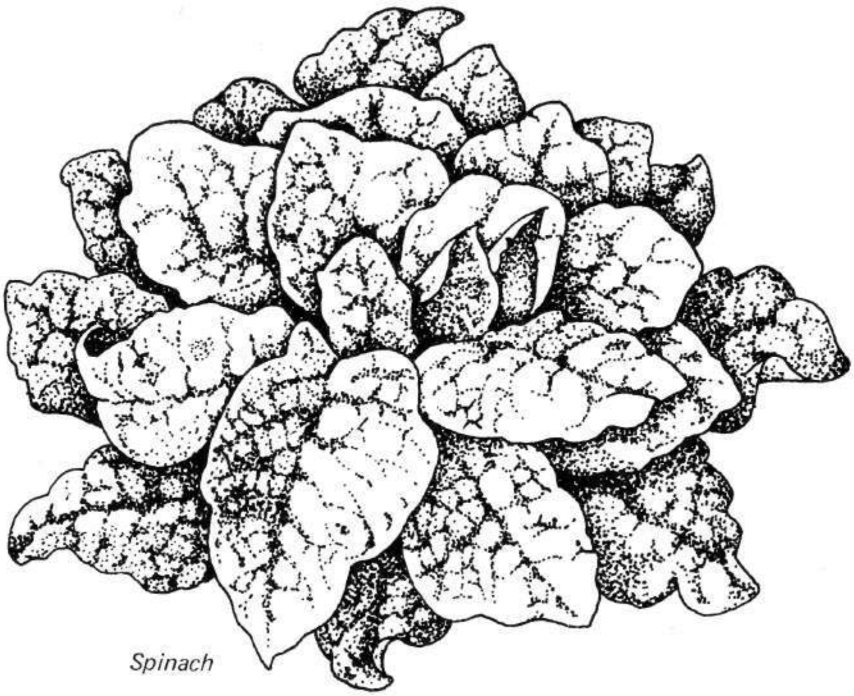
spinach has a very high iron content. Spinach was brought to America by the early colonists; the Chinese were using it in the sixth century, and the Spanish used it by the 11th century.

New Zealand spinach (Tetragonia expansa) comes — as the name indicates — from New Zealand. It's a tender annual with weak, spreading stems two to four feet long, sometimes longer, and it's covered with dark green leaves that are two to four inches long. New Zealand spinach is not really spinach at all, but when it's cooked the two are virtually indistinguishable. The leaves of New Zealand spinach are smaller and fuzzier than those of regular spinach, and it has the advantage of being heat-tolerant and able to produce all summer. Heat makes regular spinach bolt, or go to seed, very quickly.

Where and when to grow

Spinach is very hardy and can tolerate cold — in fact, it thrives in cold weather. Warm weather and long days, however, will make it bolt, or go to seed. Ideal spinach weather is 50° to 60°F. Spinach grows well in the winter in the South, and in early spring and late summer in the North. Plant it about four weeks before your area's average date of last frost.

New Zealand spinach likes long warm days. It grows best at 60° to 75°F and won't start growing until the soil warms up. It has a short season, however (55 to 65 days), so it can be grown successfully in most areas of the United States. Plant it on the average date of last frost for your area. Plant New Zealand spinach to supply you with a summer harvest long after it's too hot for regular spinach.



Spinach

How to plant

Both spinach and New Zealand spinach are grown — like beets and chard — from seed clusters that each produce several seedlings. This means they must be thinned when the seedlings appear. Both types tolerate partial shade and require well-drained soil that's rich in organic matter. Spinach does not like acid soil. When you're preparing the soil for planting, work in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Plant spinach seed clusters half an inch deep, two to four inches apart, in rows 12 to 14 inches apart, and when the seedlings are large enough to handle, thin them to leave the strongest seedling from each cluster.

For New Zealand spinach, plant the seed clusters half an inch deep, 12 inches apart, in rows 24 to 36 inches apart. Thin when the seedlings are large enough to handle, leaving the strongest seedling from each cluster to grow. Cut off the others with scissors at soil level.

Fertilizing and watering

Fertilize both types before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Spinach does best when the soil is kept uniformly moist. Try not to splash muddy water on the

leaves — it will make the spinach difficult to clean after harvesting. Mulch to avoid getting soil on the leaves. New Zealand spinach especially needs a regular supply of water to keep it producing lots of leaves.

Special handling

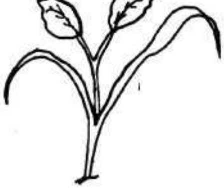
Spinach does not like competition from weeds. Cut weeds at ground level to avoid damaging the shallow roots of the spinach plants.

Pests

Aphids and, occasionally, leafminers may attack spinach. Pinch out aphid-infested foliage, and remove leaves on which leafminers have laid their eggs — look for the eggs on the undersides of the leaves. Control aphids chemically with Malathion or Diazinon; chemical controls are ineffective on leafminers once they're inside the leaf. New Zealand spinach has no serious pest problems and is a good crop for the organic gardener. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Parti.

Diseases

Spinach is susceptible to rust, but most varieties are rust-resistant. Planting disease-resistant varieties and maintaining the general cleanliness and health of your garden will help cut down the incidence of disease. If a plant does become infected, remove it before it can spread disease to healthy plants. New Zealand spinach has no serious disease problems. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Part 1.



Spinach seedling

New Zealand spinach seedling

When and how to harvest

For spinach, time from planting **to** harvest is 40 to 52 days, and a 10-foot row should yield about five pounds of spinach leaves. To harvest, either pick the outside leaves periodically, or pull up the whole plant at one time. Be sure to wash spinach thoroughly to eliminate the grit that sometimes sticks to the crinkled leaves.

For New Zealand spinach, time from planting to harvest is 55 to 65 days, and a 10-foot row will produce about five to 10 pounds of leaves. To harvest keep cutting the tender tips off the ends of the stems; this will encourage new growth, and you can harvest until the first frost.

Storing and preserving

Both types of spinach can be refrigerated for up to one week. They can also be frozen, canned, or dried. Spinach seeds can also be sprouted. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Both spinach and New Zealand spinach can be used in the same ways, and the following suggestions apply to both. Fresh

New Zealand spinach

spinach is wonderful in salads, and its dark green leaves add color and variety to lettuce. Add orange segments and almonds to a salad of fresh spinach, and toss in a sweet-sour dressing. Or add crumbled bacon, hard-cooked egg, and croutons. Add cubes of cheese to spinach, peppers, and sliced fresh mushrooms for an appealing lunch-time salad. Children who hate cooked spinach on principle often enjoy it raw. Cooked spinach is delicious creamed or in a souffle, in crepes or topped with poached eggs. Try it with a horseradish sauce, or with melted butter and a little garlic. Spinach is an attractive ingredient for a quiche; add flaked salmon for a more . substantial meal.

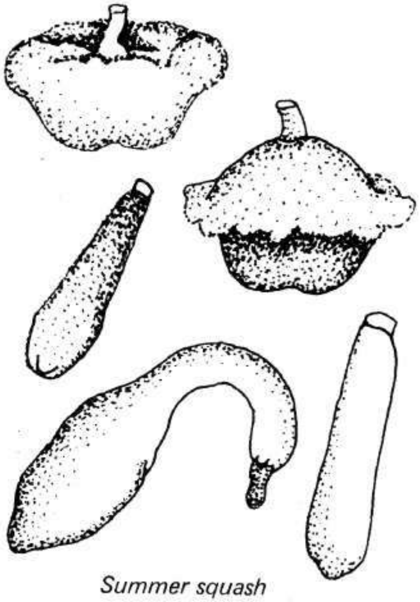
Sprouts

See Brussels sprout; see also "How to Sprout Vegetables," Part 3

Squash, summer

Common names: summer squash, crookneck, pattypan, straightneck, scallop, zucchini
Botanical name: Cucurbita species
Origin: American tropics

Varieties
Crookneck: Golden Summer Crookneck (53 days). **Scallop or pattypan:** Peter Pan (60 days); Scallopini hybrids (60 days); St. Patrick Green Tint (60 days). Straightneck: Early Prolific Straightneck (50 days). Zucchini: Gold Rush (60 days); Zucchini hybrids (60 days). These are only a few of the varieties available. Ask your Cooperative Extension Service for other specific recommendations for your area.


Summer squash

Description

The cucumber family, to which squashes belong, probably has the greatest diversity of shapes and sizes of any vegetable family except the cabbages. It's the genus Cucurbita and includes certain gourds and pumpkins, as well as squashes. Most are trailing or climbing plants with large yellow flowers (both male and female); the mature fruits have a thick skin and a definite seed cavity. "Summer squash," "winter squash," and "pumpkin" are not definite botanical names. "Pumpkin," which any child can tell you is a large vegetable used for jack-o'-lanterns and pies, is applied to long-keeping varieties of C. *moschata, C. pepo,* and a few varieties of C. *maxima.* Summer squashes are eaten when they are immature; winter squashes are eaten when mature.

Squashes are hard to confine. A bush-type zucchini will grow well in a tire planter if kept well-watered and fertilized; a vining squash can be trained up a fence. Summer squashes are weak-stemmed, tender annuals, with large, cucumberlike leaves and separate male and female flowers that appear on the same plant. Summer squash usually grows as a bush, rather than as a vine; the fruits have thin, tender skin and are generally eaten in the immature stage before the skin hardens. The most popular of the many kinds of summer squashes are crookneck, straightneck, scallop, and zucchini.

Where and when to grow

Squashes are warm-season crops and very sensitive to cold and frost. They like night temperatures of at least 60°F. Don't plant the seeds until the soil has warmed up in spring, about two to three weeks after the average date of last frost for your area. Direct-seeding is best for squashes, but if you're planting a variety that requires a longer growing season than your area can provide, use transplants from a reputable nursery or garden center, or grow your own. To grow your own transplants, start four to five weeks before your outdoor planting date, and use individual plantable containers to lessen the risk of shock when the seedlings are transplanted. Make sure that the plantable containers are large enough for the variety of squash you're planting.

How to **plant**

Squash varieties like well-worked soil with good drainage. They're heavy feeders, so the soil must be well fertilized. When you're preparing the soil for planting, work in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Two to three weeks after your area's average date of last frost, when the soil is warm, plant squash in inverted hills. Make inverted hills by removing an inch of soil from an area about 12 inches across and using this soil to form a ring around the circle. Make the inverted hills three to four feet apart, and plant four or five seeds in each one. When the seedlings are large enough to handle, thin them to leave the two or three strongest young plants standing. Cut the thinned seedlings off at soil level with scissors; if you pull them out

you'll disturb the roots of the remaining seedlings.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Part 1.

Keep the soil evenly moist; squashes need a lot of water in hot weather. The vines may wilt on hot days because the plant is using water faster than the roots can supply; if the vines are getting a regular supply of water, don't worry about the wilting — the plants will liven up as the day gets cooler. If squash vines are wilting first thing in the morning, water them immediately.

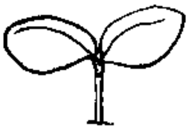
Zucchini

Special handling

If you grow squashes indoors, or in an area where there are no insects to pollinate the female flowers — your 51st-floor balcony, for instance — you may need to pollinate the flowers yourself. Take a soft-bristled brush and dust the inside of a male flower (the one without an immature fruit on the stem), then carefully dust the inside of the female flowers.

Pests

Squash bugs, squash borers, and cucumber beetles are the major pests that squash plants attract. They don't usually show up until you have a good harvest, so squash is still a good choice for the organic gardener. Squashes are prolific, so you can afford to lose a few of your crop to the bugs. Beetles can often be controlled by hand-picking or hosing them off the plants. Control them chemically with carbaryl. To control borers, apply carbaryl to the crowns of the plants at weekly intervals. Do this as soon as there's any suspicion of damage — once the borers get inside the plants, chemical controls are ineffective. If a small hole in the stem tells you borers are already inside, you may still be able to save the plant. Slit the stem, remove the borers, and dispose of them. Then cover the area with soil to encourage root development at that point.


Squash seedling

Detailed information on pest control is given in "Keeping Your Garden Healthy" in Part 1.

Diseases

Squashes are susceptible to bacterial wilt, mosaic virus, and mildew. Planting disease-resistant varieties when they're available and maintaining the general cleanliness and health of your garden will help lessen the incidence of disease. When watering, try to keep water off the foliage, and don't handle the plants when they're wet — this can cause powdery mildew and spread disease. If a plant does become infected, remove and destroy it before it can spread disease to healthy plants. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Part 1.

when and how to harvest

Time from planting to harvest depends on the variety, as does the yield you can expect. Harvest summer squashes when they're young — they taste delicious when they're small, and if you leave them on the plant too long they will suppress flowering and reduce your crop. Harvest summer squashes like the zucchini and crookneck varieties when they're six to eight inches long; harvest the round types when they're four to eight inches in diameter. Break the squashes from the plant, or use a knife that you clean after cutting each one; if the knife is not perfectly clean, it can spread disease to other plants.

Storing and preserving

Summer squashes can be stored in the refrigerator for up to one week; don't wash them until you're ready to use them. They can also be frozen, canned, pickled, or dried. Detailed information on storing and preserving is given in Parts.

Serving suggestions

Summer squashes lend themselves to a good variety of culinary treatments. Saute slices of summer squash with onions and tomatoes for a robust but delicately flavored side dish. Add sliced zucchini and mushrooms to a thick tomato sauce for spaghetti. Halve summer squashes and stuff with a meat or rice mixture, or bake them with butter and Parmesan cheese. Pan-fry slices of summer squash, or simmer them with fruit juice for a new flavor. Use the popular zucchini raw on a relish tray and among vegetables for a tempura or slice it thinly in salads. Use the larger fruits for making zucchini bread.

Squash, winter

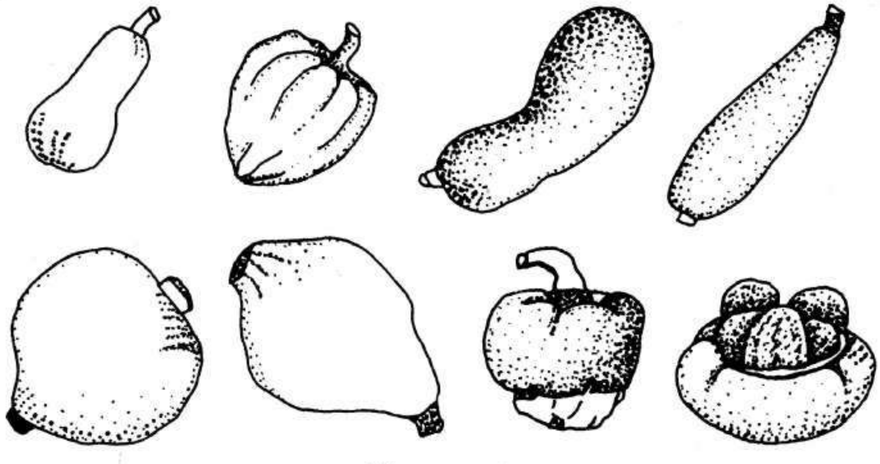
Common names: acorn, banana, buttercup, butternut, cushaw, delicious, hubbard, spaghetti, Turk's turban
Botanical name: Cucurbita species
Origin: American tropics

Varieties

Not every type of winter squash has specific recommended varieties. These are some of the varieties available; ask your Cooperative Extension Service for other specific recommendations for your area. **Acorn:** Ebony (80 days); Table Ace (85 days); Table King (bush-type, 85 days). **Butternut:** Waltham (95 days); Butterbush (small-fruited bush, 90days); Hercules (95 days). **Delicious:** Golden Delicious (100 days). **Hubbard:** Kinred (100 days); Blue Hubbard (100 days).

Description

The cucumber family, to which squashes belong, probably has the greatest diversity of shapes and sizes of any vegetable family, except the cabbages. It's the genus Cucurbita, and includes certain gourds, and pumpkins, as well as squashes. Most are trailing or climbing plants with large yellow flowers (both male and female); the mature fruits have a thick skin and a definite seed cavity. "Summer squash," "winter squash," and "pumpkin" are not definite botanical names. "Pumpkin," which any child can tell you is a large vegetable used for jack-o'-lanterns and pies, is applied to long-keeping varieties of C. *moschata,* C. *pepo,* and a few varieties of C. *maxima.* Summer squashes are eaten when they are immature;

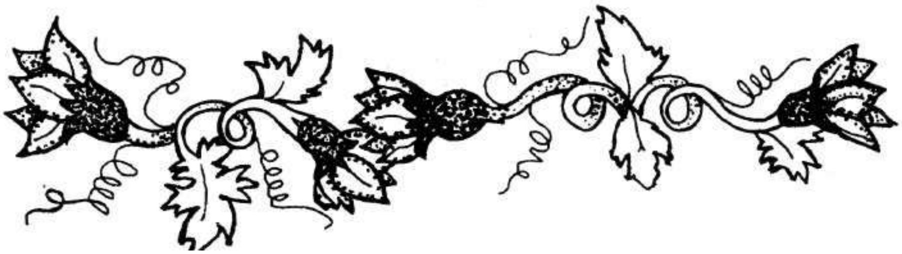


Winter squash

winter squashes are eaten when mature. Squashes are hard to confine. A bush-type squash will grow well in a tire planter if kept well-watered and fertilized; a vining squash can be trained up a fence.

Gourds are a close relation of squash. They're warm-season vining crops that are grown primarily for decorative uses; you can also make cooking utensils out of them, and some of them can be eaten when immature. They have the same growing requirements as winter squash, and they're harvested in fall when the shells are hard and glossy. The importance of the gourd was recognized by Henri Christophe, who fought in the American Revolution under Lafayette and was a leader of the slave revolt in Haiti in the early 19th century. As Henry I, he used gourds as a medium of exchange, and Haitian currency is still called *gourde,* which is also Louisiana slang for a dollar.

Winter squashes are weak-stemmed, tender annuals, with large, cucumberlike leaves and separate male and female flowers that appear on the same plant. Most winter squashes grow as vines, although some modern varieties have been bred to have a more compact, bushy habit of growth. Winter squash varieties have hard skins when they're harvested and eaten. Popular types of winter squash include hubbard, butternut, acorn, delicious, banana, Turk's turban, buttercup, and cushaw. Spaghetti squash is technically a small pumpkin and is planted and cared for like pumpkins. Vining types of winter squash can be caged or trained to climb up a fence or trellis to save space. If you're growing a variety that will need support, set the support in place at the time of planting. If you do It later, you risk damaging the plants' roots.



Where and when to grow

Squashes are warm-season crops and very sensitive to cold and frost. They like night temperatures of at least 60°F. Don't plant the seeds until the soil has warmed up in spring, about two to three weeks after the average date of last frost for your area. Direct-seeding is best for squashes, but if you're planting a variety that requires a longer growing season than your area can provide, use transplants from a reputable nursery or garden center, or grow your own. To grow your own transplants, start four to five weeks before your outdoor planting date, and use individual plantable containers to lessen the risk of shock when the seedlings are transplanted. Make sure that the plantable containers are large enough for the variety of squash you're planting.

Squash seedling

How to plant

Squash varieties like well-worked soil with good drainage. They're he^avy feeders, so the soil must be well-fertilized. When you're preparing the soil for planting, work in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Two to three weeks after your area's average date of last frost, when the soil is warm, plant squash in inverted hills. Make inverted hills by removing an inch of soil from an area about 12 inches across and using this soil to form a ring around the circle. Make the inverted hills three to four feet apart, and plant four or five seeds in each one. When the seedlings are large enough to handle, thin them to leave the two or three strongest young plants standing. Cut the thinned seedlings off at soil level with scissors; if you pull them out you'll disturb the roots of the remaining seedlings.

Fertilizing and watering

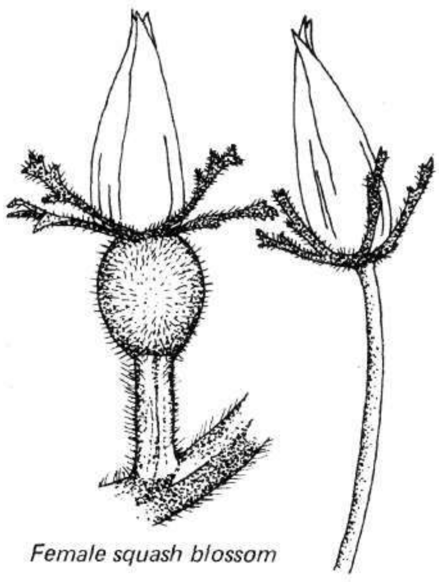
Fertilize before planting and again at midseason, at the same

rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Part 1.

Keep the soil evenly moist; squashes need a lot of water in hot weather. The vines may wilt on hot days because the plant is using water faster than the roots can supply; if the vines are getting a regular supply of water, don't worry about the wilting — the plants will liven up as the day gets cooler, if squash vines are wilting first thing in the morning, water them immediately.

Special handling

If you grow squashes indoors or in an area where there are no insects to pollinate the female flowers — your51st-fioor balcony, for instance — you may need to pollinate the flowers yourself. Take a soft-bristled brush and dust the inside of a male flower



Female squash blossom

Male squash blossom

(the one without an immature fruit on the stem), then carefully dust the inside of the female flowers.

Pests

Squash bugs, squash borers, and cucumber beetles are the major pests that squash plants attract. They don't usually show up until you have a good harvest, so squash is still a good choice for the organic gardener. Squashes are prolific, so you can afford to lose a few of your crop to the bugs. Beetles can often be controlled by hand-picking or hosing them off the plants. Control them chemically with carbaryl. To control borers, apply carbaryl to the crowns of the plants at weekly intervals. Do this as soon as there's any suspicion of damage — once the borers get inside the plants, chemical controls are ineffective. If a small hole in the stem tells you borers are already inside, you may still be able to save the plant. Slit the stem, remove the borers, and dispose of them. Then cover the area with soil to encourage root development at that point. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Part 1.

Diseases

Squashes are susceptible to bacterial wilt, mosaic virus, and mildew. Planting disease-resistant varieties when they're available and maintaining the general cleanliness and health of your garden will help lessen the incidence of disease. When watering, try to keep water off foliage, and don't handle the plants when they're wet — this can cause powdery mildew and spread disease. If a plant does become infected, remove and destroy it before it can spread disease to healthy plants. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Part 1.

When and how to harvest

Leave winter squashes on the vine until the skin is so hard that it cannot be dented with your thumbnail, but harvest before the first frost. Break it off the vine, or cut it off with a knife that you clean after cutting each one; if the knife is not perfectly clean, it can spread disease to other plants.

Storing and preserving

Cure squashes in a dark, humid place for 10 days at 80° to 85°F; then store them at 50° to 60°F in a moderately dry, dark place for five to six months. Winter squashes can also be frozen or dried, and the seeds can be sprouted. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Winter squashes lend themselves to a good variety of culinary treatments and have the flexibility of adapting to both sweet and savory uses. Cut winter squashes into halves and bake them; serve them with honey or brown sugar and butter. Fill the halves with browned sausages, or mash the pulp and season well with salt and pepper. As a treat for the children, top mashed squash with marshmallow and brown it under the grill. Use the pulp of winter squash as a pie filling — it makes a pleasant change from pumpkin.

Sweet corn,
See Corn

Sweet pepper,
See Pepper

Sweet potato

Common names: potato, sweet potato, yam
Botanical name: Ipomoea batatas
Origin: tropical America and Caribbean

Varieties
Centennial (150 days); Goldrush (140 days); Jasper (150 days).

Description

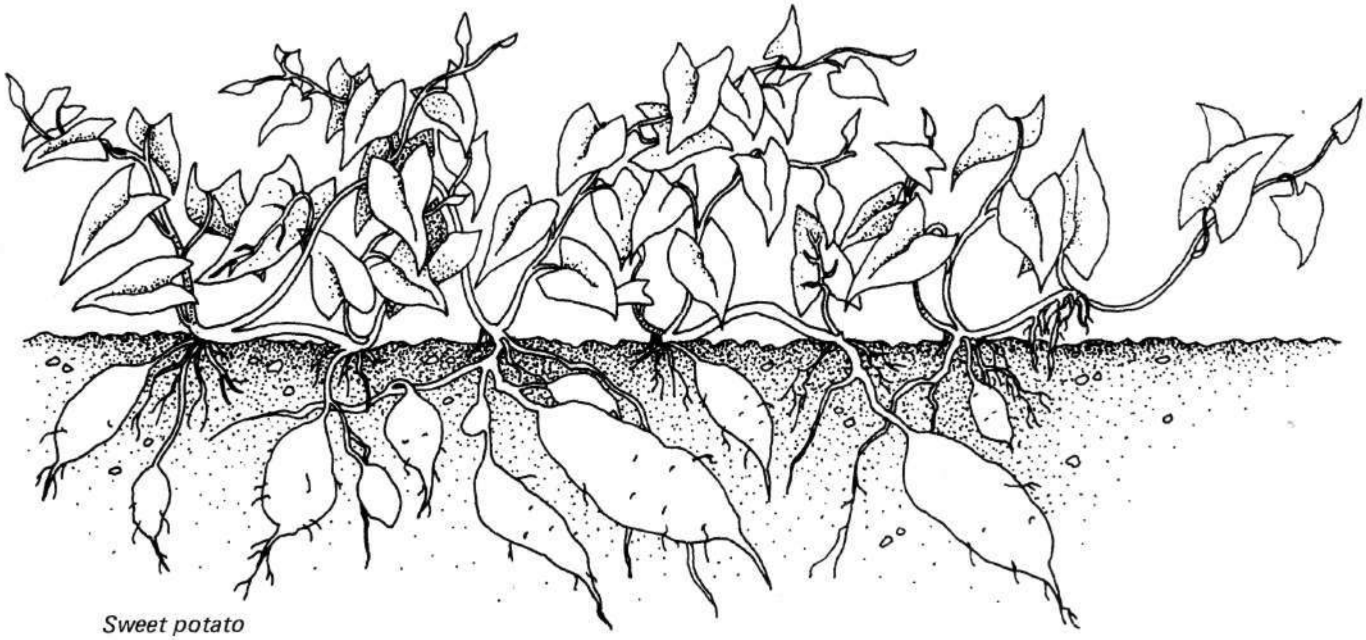
The sweet potato is a tender vining or semi-erect perennial plant related to the morning glory. It has small white, pink, or red-purple flowers and swollen, fleshy tubers that range in color from creamy-yellow to deep red-orange. There are "dry" and "moist" kinds of sweet potatoes, which describes the texture when they're eaten; some dry varieties have a higher moisture content than some moist ones. The moist varieties are often called yams, but the yam is actually a different species that is found in tropical countries. Sweet potato vines are ornamental, so this vegetable is often grown as ground cover or in planters or hanging baskets. You can even grow a plant in water in your kitchen — suspend the sweet potato on toothpicks in a jar of water, and watch it grow.

Where and when to grow

Sweet potatoes are extremely sensitive to frost and need warm, moist growing weather. They have a long growing season — about 150 days — and in areas with a shorter growing season, tend to produce small potatoes. Don't try to hurry sweet potatoes; plant them four weeks after the average date of last frost for your area, or when the soil is thoroughly warm.

How to plant

Sweet potatoes are planted from rooted sprouts, or slips, taken from a mature tuber. To grow your own slips, place several sweet potato roots about an inch apart in a hotbed and cover with two inches of sand or light soil. Add another inch of soil when the shoots appear, keep the bed at a temperature between 70° and 80°F, and don't let it dry out. In



Sweet potato

about six weeks you will have rooted slips that can be planted in the garden. Refer to "Planning Your Garden" for information on making and using a hotbed. If you don't want to go to the trouble of growing your own, buy slips from a reputable garden center or supplier.

A good, sandy soil is best for sweet potatoes. Over-rich soil produces luxuriant vines but small tubers. The soil should be moderately fertile, rich in organic matter, and well-worked to ensure looseness. Remove all soil lumps, rocks, or other obstacles that might cause deformity of the tubers, and work in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. For good tuber production sweet potatoes must have full sun; in partial shade the vine will be handsome but not very productive. Set the slips on ridges made by mounding up the soil about eight inches high along rows three feet apart. Make the ridges about 12 inches wide, and set the slips at 12-inch intervals.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Part 1.

If the soil is too wet, the roots of sweet potatoes may rot; in well-worked, loose soil this should not be a problem. Although sweet potatoes will survive dry seasons, the yield is much higher if they get an inch of water every week until three or four weeks before harvesting. Do not water during the last three or four weeks.

Pests

Insects and diseases are not much of a problem in the North. In the South, sweet potato weevils and wireworms are common pests. The damage they do appears in the form of stunting or weakening of the plants. Both pests can be controlled by a soil drench of Diazinon. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Parti.

Diseases

Fungus diseases and root rot may attack sweet potatoes. Planting disease-resistant varieties and maintaining the general cleanliness and health of your garden will help cut down the incidence of disease. If a plant does become infected, remove it before it can spread disease to healthy plants. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Parti.

When and how to harvest

The tubers are damaged by freezing or cold soils, so dig up sweet potatoes early rather than late, before the first frost. Be careful when you dig — these potatoes are thin-skinned and bruise easily.

Storing and preserving

Cure sweet potatoes in crates in a dark, humid place for 10 days at 80° to 85°F; then store them at 55° to 60°F in a moderately moist place for four to six months. You can also freeze, can, or dry them. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Sweet potatoes are very versatile; you can boil, steam, fry, or bake them, and they take well to either sweet or savory seasoning. Use pureed sweet potatoes in bread or cookies. Candy them, or stuff them and bake them in their skins, include slices of raw sweet potato with the vegetables for a tempura. Cinnamon, cloves, nutmeg, and allspice all go well with sweet potatoes.

Tomato

Common names: tomato, love apple
Botanical name: Lycopersicon esculentum
Origin: tropical America

Varieties

The varieties of tomatoes available would fill a book. Choose them according to your growing season, whether you plan to stake or cage them or let them sprawl, and what you want to do with the fruit. Some varieties are specially suited to canning and preserving, others are better for salads. Beefsteak varieties are the large kind with rather irregularly shaped fruits. Patio varieties are suited to growing in containers or small spaces, and cherry tomatoes are the very small, round ones. Ask your Cooperative Extension Service for specific recommendations for your area.

The following are just a few of

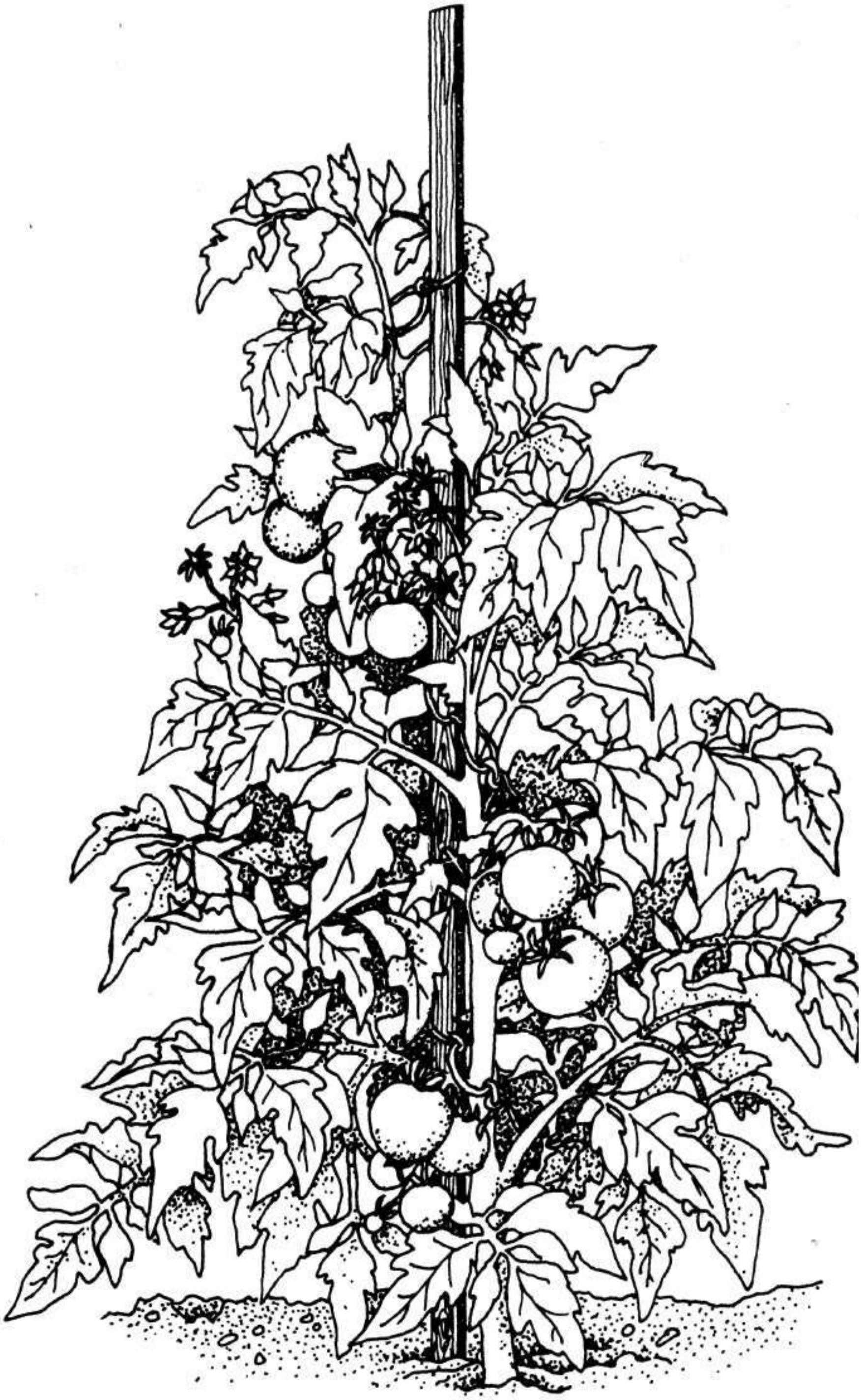
the varieties available and are well-adapted for use in most areas. The initials V, F, and N refer to disease resistance; some varieties are resistant to verticillium (V), fusarium (F), and/or nematodes (N). If you've never had any problem with any of these, you can try any variety. If you have had difficulty growing tomatoes in the past you'll do better to stay with resistant varieties.

Varieties for general use: Better Boy (VFN, 72 days); Burpee's Big Boy (78 days); Early Girl (V, 62 days); Fantastic (70 days); Heinz 1350 (VF, 75 days); Terrific (VFN, 70 days); Wonder Boy (VFN, 80 days). **Beefsteak varieties:** Beef master (VFN, 80 days); Pink Ponderosa (90 days). **Patio varieties:** Pixie (52 days); Toy Boy (68 days); Tiny Tim (55 days). **Cherry varieties:** Small Fry (VFN, 60 days); Tumblin' Tom (72 days). **Canning tomatoes:** Roma VF (VF, 75 days); Chico III (F, 75 days); Royal Chico (75 days).

Description

Tomatoes are tender perennials grown as annuals. They have weak stems and alternate lobed and toothed leaves that have a distinctive odor. The yellow flowers grow in clusters. Most tomatoes have vining growth habits and need a fair amount of space. Some are advertised as bush varieties that save space, but they'll still sprawl if you let them, and you may still have to stake or cage them. Depending on the variety, the fruit varies in size and in color— red, yellow, orange, and white.

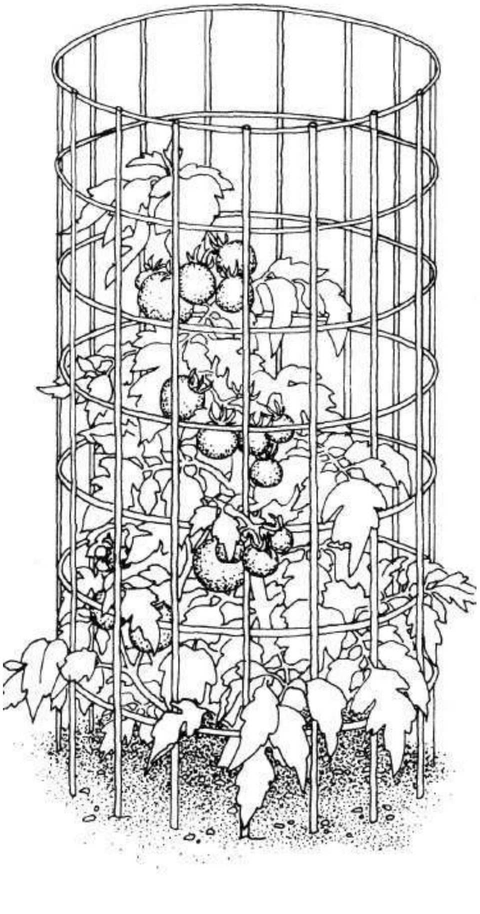
Tomatoes can be divided into two main groups, according to growth habits: determinate and



Tomato plants take up a lot of space if you let them sprawl. A strong stake supports the plant and keeps the fruit clean.

indeterminate. On the determinate tomato (bush tomato), the plant stops growing when the end buds set fruit— usually about three feet tall. It seldom needs staking. On the indeterminate tomato (vine tomato), the end buds do not set fruit; the plant can grow almost indefinitely if not stopped by frost. Most of the varieties that are staked or caged are indeterminate tomatoes.

Tomatoes are also classified by the size and shape of their fruit (currant, cherry, plum, pear, etc.), by their color (red, pink, orange, yellow, and cream), and by their use (eating, canning, pickling). When you're short on garden space, grow tomatoes in a large pot or container. Dwarf tomatoes can be grown in one cubic foot of soil, and standard tomatoes can be grown in two to three cubic feet of soil. The small-fruited tomatoes do very well in hanging baskets or window boxes. Plants growing in containers may easily exhaust the available moisture, in which case the leaves will wilt. However, the plants will revive when they're watered.



Tomatoes in a cage are easy to take care of.

Vining tomatoes can be staked or caged to support the fruit, or can be left to sprawl naturally on the ground. Naturally sprawling tomatoes require less work than staked or caged plants; they are less likely to develop blossom end rot, and they produce more fruit per plant. In dry areas, sprawling on the ground protects the fruit from sunburn. But sprawling tomatoes are harder to cultivate than staked or caged plants, and they need mulching under the fruit to keep them clean to reduce disease. Staked tomatoes give you cleaner fruit, less loss from rot, and less loss from problems that occur in warm humid areas. They require less room for each individual plant. On the negative side, they produce less fruit per plant, are much more susceptible to blossom end rot, and are more work. Caged tomatoes require less work than staked tomatoes, but slightly more effort than doing nothing. Caged tomatoes conserve space, keep the fruit cleaner, and are easier to work around in small areas.

Where and when to grow

Tomatoes grow best when the day temperature is between 65° and 85°F. They stop growing if it goes over 95°F, and if the night temperature goes above 85°F the fruit will not turn red. The flowers will not set fruit if the temperature goes below 55°F at night. Start tomatoes either from seed planted in the garden on the average date of last frost for your area or from transplants set in the garden two to three weeks after the average date of last frost, when the soil has warmed up.

How to plant

Tomatoes must have full sun and need warm, well-drained, fertile soil. Although they will produce earlier in sandy soils, they will have a larger yield in clay soils. When you're preparing the soil for planting, work in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Plant seeds half an inch deep in rows 24 to 48 inches apart (depending on how large the variety will grow). When the seedlings are large enough to handle, thin them to 18 to 36 inches apart.

Set the plants out on a cloudy day or in the late afternoon. If the sun is very hot, protect the plants with hats made of newspapers. Disturb the roots as little as possible when transplanting. Plants should be gently slipped out of clay and plastic pots. If they're planted in peat pots, plant the entire container. Make sure the tops of the containers are below the soil's surface or the peat will act like a wick and evaporate the soil moisture. If the plants are

growing together in a flat, cut the plants apart several days before transplanting them.

Put the plant in the soil so that it's deeper than it was growing before, up to the first leaves. If the stem is very long or spindly, lay it on a slant so that only the leaves are above soil level. The roots will grow from the submerged stem, making a sturdier plant. Set the transplants 18 to 36 inches apart in rows 24 to 48 inches apart, depending on the variety.

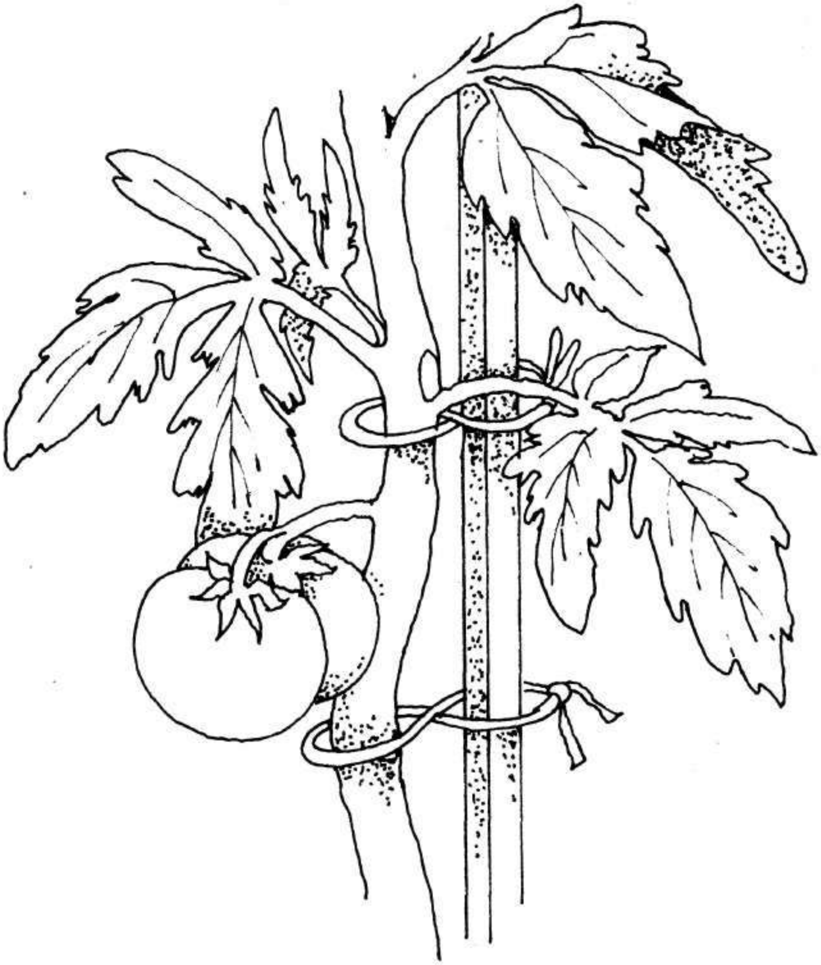
Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Tomatoes need lots of water, but they don't like to swim. Water thoroughly before the soil dries out. During the hot days of summer the leaves sometimes wilt because they use more water than their roots can supply. Don't worry about this if the tomatoes are receiving a regular supply of water. If the plants are wilting first thing in the morning, however, water them at once. Sometimes tomato plants curl their leaves as a survival tactic on hot days or during a long period of no rain. This is nothing to worry about; just water them.

Special handling

To stake tomatoes, use six-foot stakes (one by two inches) or reinforcing rods, and set the supports at the time of transplanting. Staked tomatoes should be pruned so that they grow one straight stem. Prune by removing any suckers that



Staked tomatoes should be pruned to grow one straight stem.

appear below the first fruiting cluster — the accompanying illustration shows how to prune a staked tomato plant. The suckers are not productive, so you don't affect the yield by pruning, and pruned plants have more energy to develop fruit. Let the suckers develop two leaves above the first fruiting cluster and then pinch out the rest of the sucker; the extra leaves will provide shade for the fruit. To cage tomatoes, use six-by-six-inch mesh concrete reinforcing wire.

A five-foot width can be cut five feet long and bent into a cylinder by locking the ends. Remove the bottom strand and push the whole cage into the ground six inches deep around the tomato plant. If the area is windy, drive in a supporting stake. Or use commercially produced cages — you can now buy square cages that have the advantage of folding flat for storage.

Tomato plants will not set fruit in rainy or very humid weather. Sometimes a plant that has plenty of water and fertilizer produces a lot of foliage but no tomatoes. As a last resort, try giving the plant a shock by pruning it back and cutting down on water; it may start producing.

Pests

Aphids, tomato hornworms, cutworms, tomato fruitworms, and whiteflies are the major problems. Tomatoes are almost always attacked by some insect and may not be the best choice for the organic gardener; however, the fresh taste of a ripe tomato may overpower the logical choice. Collars placed around the plants at the time of transplanting help to discourage cutworms, and hornworms can be hand-picked off the plants. Aphids and whiteflies can be discouraged by hosing them off the plants or pinching out infested foliage. Malathion or Diazinon chemically control aphids and whiteflies. Detailed information *on* pest control is given in "Keeping Your Garden Healthy" in Part 1.

Diseases

Verticillium wilt, fusarium wilt, early blight, septoria leafspot, tobacco mosaic virus, and blossom end rot are diseases that can attack tomatoes. Planting disease-resistant varieties and maintaining the general cleanliness and health of your garden will help cut down the incidence of disease. Keep moisture off the leaves as far as possible, and avoid handling the plants when they're wet. If you smoke, wash your hands thoroughly before working with tomato plants to avoid spreading tobacco mosaic virus. If a plant does become infected with any disease, remove it before it can spread disease to healthy plants. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Part 1.

When and how to harvest

Time from planting to harvest is 40 to 180 days from transplants, depending on variety, and several weeks longer from seed. Transplants usually produce earlier than tomatoes grown from seed. A 10-foot row will give you anywhere from 10 to 45 pounds of tomatoes. The color when ripe depends on the variety; ripe tomatoes should feel firm — neither squashy nor too hard. When the temperature is high during the day, the fruit may get soft but not red. Take hard green tomatoes inside at the end of the season to ripen; don't leave them on the plants.

Storing and preserving

Ripened tomatoes will keep up to one week in the refrigerator. You can also freeze, can, or dry them whole, sliced, as juice, paste, relish, or pickles. Green tomatoes harvested before a frost can be held in a cool, moist place up to one month to ripen. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Fresh tomatoes from your garden are wonderful with very little embellishment — slice them, and dress them with a touch of olive oil and lemon juice and a pinch of basil; or eat them as fruit. with a little sugar. Alternate slices of fresh tomato and cooked potato for an interesting side dish — add olive oil and parsley. Add tomatoes to almost any salad, or serve them alone, sliced with bread and cheese for an instant lunch. Stuff raw tomatoes with tuna, chicken, or rice, or broil them plain or topped with breadcrumbs. Serve broiled tomatoes with bacon and sausages for a hearty breakfast. Use cherry tomatoes, whole or halved, in salads or on relish trays; the green kind are delicious fried or pickled. Cooked tomatoes, whole, pureed, or as a paste, are indispensable to all sorts of dishes — spaghetti sauces, stews, and casseroles — and fresh tomato sauce, seasoned with **a** little basil, is a delightfully simple topping for pasta. Make an unusual pie by alternating layers of sliced tomatoes with chopped chives and topping with pastry. Oregano, sage, tarragon, and thyme all go beautifully with tomatoes.

Turnip

Common name: turnip
Botanical name: Brassica rapa
Origin: northeastern Europe, Siberia

Varieties
Shogin (30 days); Foliage Turnip (30 days); Tokyo Cross (35 days); Tokyo Market (35 days); Just Right (40 days); Purple Top White Globe (57 days).

Description

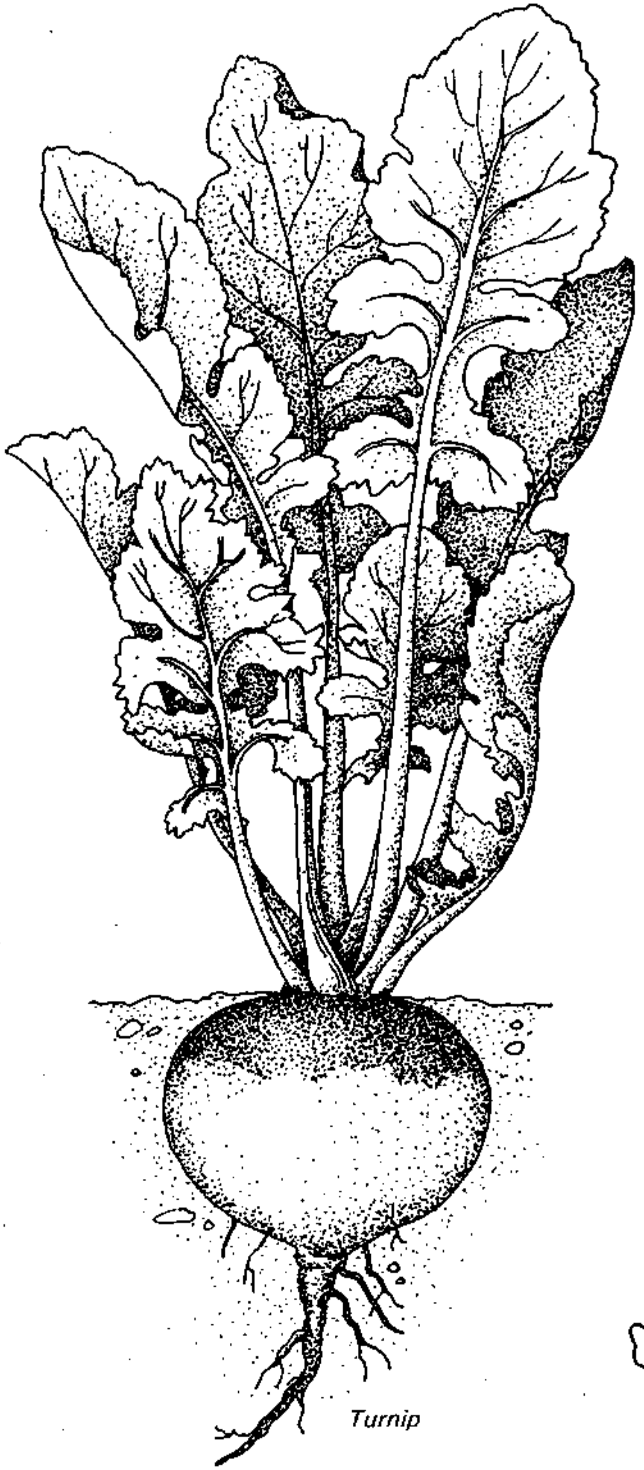
The turnip, a hardy biennial grown as an annual, sports a rosette of hairy, bright green leaves growing from a root—^which is not really a root, but a swelling at the base of the stem. The turnip is more commonly grown for use as a root vegetable, but can also be grown for the leaves, which are used as greens. Turnips originated in the Mediterranean in prehistoric times. The rutabaga, a younger cousin, is believed to have come about in the Middle Ages from a cross between a turnip and a cabbage. Englishmen have been known to refer to each other as "turniphead"; this is not a compliment, as turnips are often considered to be rather dull. In fact, they're quite versatile.

Where and when to grow

Turnips are a cool-weather crop, grown in the fall, winter, and spring in the South and in the spring and fall in the North. They don't transplant well, so grow them from seed, and plant them two to three weeks before the average date of last frost for your area.

How to plant

Turnips tolerate partial shade and need soil that's high in organic matter and well-drained but able to hold moisture. Too much nitrogen in the soil encourages ^ the plant to produce leaves and a seed stalk rather than a good-sized root, so when you're preparing the soil for planting, work in a low-nitrogen (5-10-10) fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Plant seeds half an inch deep in



Turnip

Turnip seedling

How to plant

Watermelons must have full sun, and prefer well-drained soil that holds moisture well. When you're preparing the soil for planting, work in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet or 10 pounds per 1,000 square feet. Crow watermelons in inverted hills, made by removing an inch of soil from a circle 12 inches across and using the soil to form a rim around the circle. Space the hills six feet apart, and plant four to five seeds in each hill. When the seedlings have developed three or four true leaves, thin them to leave the strongest one or two seedlings in each hill. Cut the thinned seedlings with scissors at soil level to avoid damaging the survivors' root systems. Where cucumber beetles, other insects. or weather are a problem, wait a bit before making the final selection. If you're using transplants, put two or three In each hill.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Watermelons are 95 percent water, so make sure they have enough to keep them growing well. Do not let the soil dry out, and use a mulch to keep the soil moisture even.

Special handling

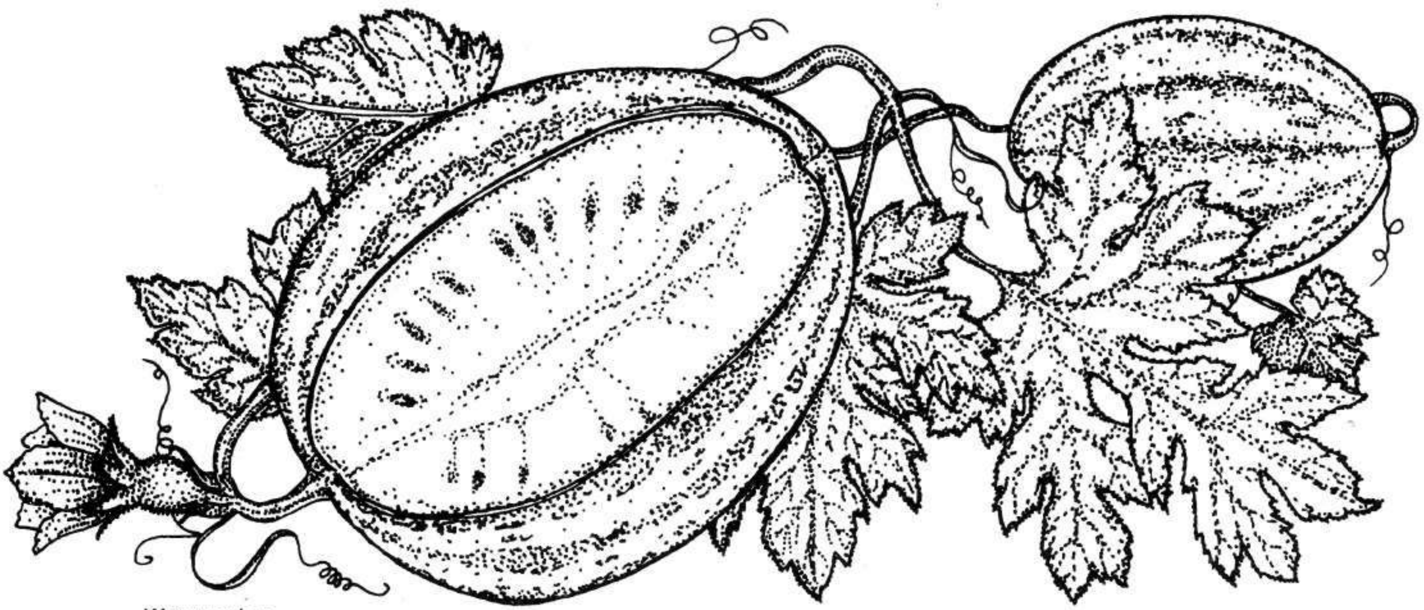
As the watermelons develop, provide a support for the fruit. If they're growing on a fence or trellis, support the fruit with a net. If the vines are trailing on the ground, put a board under the fruit to keep it off the ground. Mulch helps keep the fruit clean as well as regulating soil moisture.

Pests

Cucumber beetles may visit your watermelon vines. They don't cause much feeding damage, but they carry cucumber bacterial wilt; hand-pick them off the vines as soon as they appear. Watermelons are a good crop for the organic gardener who has lots of space. Detailed information on pest control are given in "Keeping Your Garden Healthy" in Parti.

Diseases

Watermelons are susceptible to anthracnose and wilt. Planting

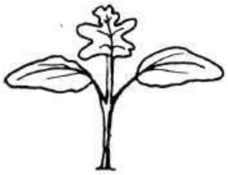


Watermelon

disease-resistant varieties when they're available and maintaining the general cleanliness and health of your garden will help cut down the incidence of disease. Don't handle the vines when they're wet. If a plant does become infected, remove it before it can spread disease to healthy plants. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Part 1.

When and how to harvest

If one watermelon gets an early start on a vine it can suppress all further activity until it matures. Some people suggest pinching out this first watermelon to encourage more melons, but this is a gamble because, sometimes no more watermelons will set. It's easier to judge when a watermelon is ripe than it is with some other types of melon; a



Watermelon seedling

watermelon is ready to harvest when the vine's tendrils begin to turn brown and die off. A ripe watermelon will also sound dull and hollow when you rap it with your knuckles.

Storing and preserving

A watermelon will store for up to one week in the refrigerator — it takes about 12 hours to chill a large one thoroughly before you eat it. If you have a lot of melons, store them in a cool, moderately moist place for two to three weeks. You can freeze the flesh of the watermelon and make pickles with the rind.

Serving suggestions

Slices of fresh watermelon make a wonderful summer cooler. Scoop out the flesh with a melon bailer and add to other types of melon for a cool fruit salad — pile the fruit into a muskmelon half. For a great party dish, serve a big fruit salad in the scooped out half-shell of the watermelon—or carve the shell into a basket. Make pickles with the rind.

Yam,

See Sweet potato

Zucchini,

See Squash, summer

Herbs

Add fragrance to your garden and flavor to your food. Outdoors or in, easy-to-grow herbs are a delight in any garden.

Anise

Common name: anise
Botanical name: Pimpinella anisum
Origin: Europe

Varieties

Few varieties are available; grow the variety available in your area.

Description

Anise is a slow-growing annual with low, spreading, bushy plants that grow 12 to 14 inches tall and almost as wide. The flowers are yellowish-white in umbrella-shaped clusters and appear about 10 weeks after planting. The licorice-flavored seeds are most commonly used in baking, candy, or to flavor liquors. Anise used to be credited with warding off the evil eye; the Romans flavored their cakes with it on special occasions. Anise was one of the first European herbs to become popular in America.

Where and when to grow

Anise needs a long growing season — at least 120 days free of frost. It also prefers a moderate and uniform rainfall, especially at harvesttime.

How to plant

Anise prefers a well-drained fertile soil. Work a complete, well-balanced fertilizer into the soil before planting at the rate of one pound per 100 square feet. Give anise a location in full sun, and plant it from seed in early spring, two weeks after the average date of last frost. Plant the seeds a quarter inch deep in rows 18 to 24 inches apart, and when the seedlings are six weeks old, thin them to six to 12 inches apart.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Anise prefers uniform moisture especially at or just before harvesting. Alternate rainy and dry periods when the" seed is near maturity can cause it to turn brown, reducing quality and yield.

Pests

Anise has no serious pest problems.

Diseases

Anise has no serious disease problems.

When and how to harvest

Harvest the anise seed heads approximately 100 days after planting, while they are still green and immature. Be sure to harvest before the first frost.

Storing and preserving

The dry seeds can be stored for months in airtight containers. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Add anise to bouillon for fish or veal stews. Sprinkle anise seeds on an apple crisp. Aniseed balls are an old-fashioned favorite children's candy.

Anise

Basil

Common name: basil
Botanical names: Ocimum basilicum, Ocimum crispum, Ocimum minimum
Origin: India, Central America

Varieties

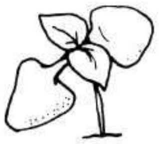
Citriodorum (lemon-scented); Dark Opal (purple-red leaves and rose-colored flowers); Minimum (dwarf variety). Or grow the variety available in your area.

Description

These tender annuals grow one to 21/2 feet tall, with square stems and opposite leaves. Basil may have either green or purple-red soft-textured leaves, and spikes of small whitish or lavender flowers. In India basil is considered a holy herb. In Italy it is a love gift, and in Romania it is an engagement token. In Greece the connotation is less romantic; there basil is a symbol of death and hatred. Basil has the distinction of being fragrant at all stages of its development.

Where and when to grow

Like most herbs, basil can be grown quite easily anywhere in the United States. It prefers a



Basil seedling

climate that does not run to extremes of temperatures, but it tolerates heat better than cold. The first fall frost will kill the plant. It's grown from seed or transplants, and you can plant either in spring, a week or two after your area's average date of last frost. Basil makes a charming houseplant — put It in a sunny window.

How to plant

Basil needs a well-drained soil that's high in organic matter. It does well in soil that many other plants wouldn't tolerate; and too-fertile soil is actually a disadvantage, because it encourages lush foliage but a low oil content, which affects the aromatic quality of the herb. If you grow from seed, sow the seed a quarter inch deep in rows 18 to 24 inches apart. When the seedlings are growing strongly, thin them to stand four to six inches apart. A sunny spot is best, but basil will tolerate light shade. Basil seeds itself and will often produce good plants if the soil is not disturbed too much in the spring. Using transplants in the spring will mean you can harvest your basil sooner. You can also buy a healthy plant from a nursery or farmers' market stand and plant that. If you want to grow basil indoors, put it in a sunny window or under lights.

Fertilizing and watering

Do not fertilize basil; overfertilizing is a disadvantage to most aromatic herbs. If the soil is very acid, sweeten it with some lime. Otherwise, let it be. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Basil

If basil needs water the leaves will wilt — give it enough water to prevent this.

Special handling

Pinch off the terminal shoots to encourage branching and slow down flower production. If you don't, the plants will get tall and leggy-

Pests

Basil has no serious pest problems.

Diseases

Basil has no serious disease problems.

When and how to harvest

Pick the basil as you need it by cutting a few inches off the top. This will encourage the plant to become bushy instead of going to flower.

Storing and preserving

Store the crushed dry leaves in an airtight container. You can also freeze the leaves. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Fresh basil gives a wonderful flavor to sliced tomatoes dressed with a little oil and lemon juice, and it's good in other salads, too. Fresh basil is the essential ingredient in pesto, a luxuriously aromatic pasta dish. You can also use the leaves — fresh or dried — with fish, game and meat dishes, on eggs, and in stews and sauces. Try herbed butter with basil, or make basil vinegar.

Borage

Common name: borage
Botanical name: Borago officinalis
Origin: Europe

Varieties

Few varieties are available; grow the variety available in your area.

Description

Borage is a tender annual that grows two to three feet tall. The stems and leaves are grey-green and covered with velvety hair, and the light blue flowers grow In drooping clusters. When borage is In flower it's a striking plant, especially if you set it high — on a wall, for instance — because the nodding flowers

Borage

are seen to best advantage from below. The flowers are used to add color to potpourri. Borage, like thyme, is supposed to give courage. An old English jingle goes: "\, Borage, Bring Courage."

Where and when to grow

Borage will grow almost anywhere in the United States. It tolerates a wide range of temperatures but will not survive a hard frost. Because of its striking coloring and unusual flowers, it makes an attractive indoor plant.

How to plant

Borage prefers well-drained sandy soil in full sun. When you're preparing the soil, dig in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet. Plant borage from seed in early spring after the average date of last frost. Plant the seeds (which germinate readily) a quarter inch deep in rows 18 to 24 inches apart, and when the plants are six to eight inches tall, thin them to stand 12 inches apart.

Fertilizing and watering

Do not fertilize borage again at midseason. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Part 1.

Let borage dry out between waterings.

Pests

Borage has no serious pest problems. Like most herbs, it's a good choice for the organic garden.

Diseases

Borage has no serious disease problems.

When and how to harvest

Harvest young leaves as needed throughout the growing season, and harvest the entire plant in the fall before frost.

Storing and preserving

Refrigerate the stems and leaves for fresh use, or freeze them. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Fresh borage leaves have a cucumberlike taste and can be used in salads, soups, and stews, or cooked like spinach. You can peel the stems and use them in salads. Borage flowers are sometimes candied for use as a garnish in fruit drinks.

Caraway

Common name: caraway
Botanical name: Carum carvi
Origin: Europe

Varieties
Few varieties are available; grow the variety available in your area.

Description

Caraway is a biennial grown for its leaves and seeds. It has fine feathery leaves that grow in a short rosette; the second year the plant produces white, dill-like flowers on fine, two-foot flower stalks. The finely cut foliage makes the caraway plant a charming foil to flowers in a garden border.

When and where to grow

If you only want the foliage, you can grow caraway anywhere in the United States. In some colder areas, however, it may need winter protection in order to produce flowers and seeds in the second year.

How to plant

Caraway prefers full sun but will tolerate partial shade; it grows best in a well-drained sandy soil. When you're preparing the soil, dig in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet. Caraway has a taproot, which makes it difficult to transplant, so grow it from seed sown in early spring in the South or in fall in cooler northern areas. Plant the seeds a quarter inch deep in rows 18 to 24 inches apart, and thin the plants to stand 12 to 18 inches apart. Caraway will reseed itself in most areas, assuring you a constant supply.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. The second year do not fertilize at midseason. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Allow caraway plants to dry out between waterings.

Pests

Caraway is a member of the parsley family, so you may encounter a parsley caterpillar. Hand-pick it off the plant.

Diseases

Caraway has no serious disease problems.

When and how to harvest

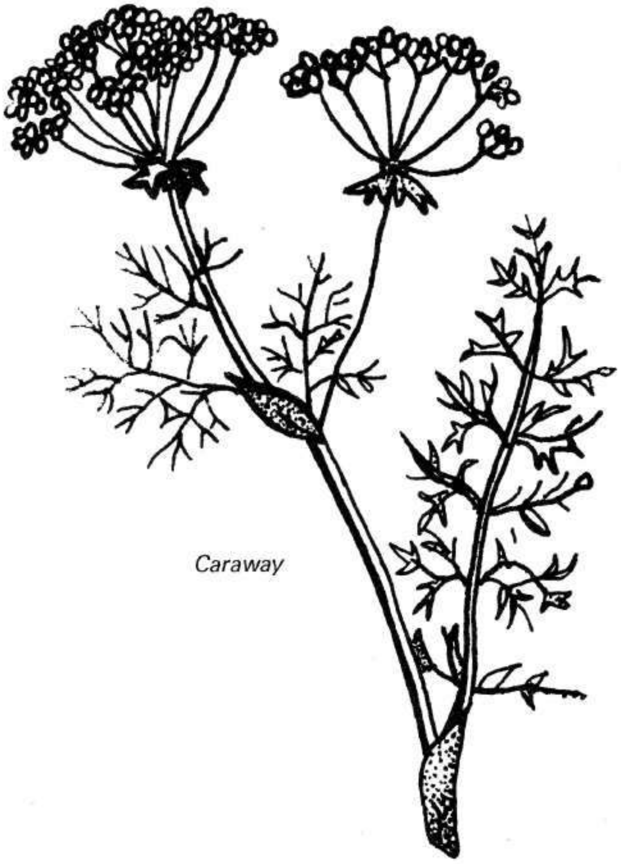
Harvest caraway leaves as needed throughout the growing season for use in soups and salads. Harvest the seeds in the fall of the second growing season. Harvest when they dry out and turn brown or before the first frost.

Storage and preserving

It's best to use caraway leaves fresh, but they can be stored in the refrigerator for a few weeks. The seeds can be stored for months in a sealed jar. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Caraway seeds have all kinds of uses—in breads, cakes, and cookies; in sauerkraut; or to flavor cheeses. They add a nice crunch, as well as a distinctive flavor.



Caraway

Chervil

Common name: chervil
Botanical name: Anthriscus cerefolium
Origin: Europe and Asia

Varieties
Few varieties are available; grow the variety available in your area.

Description

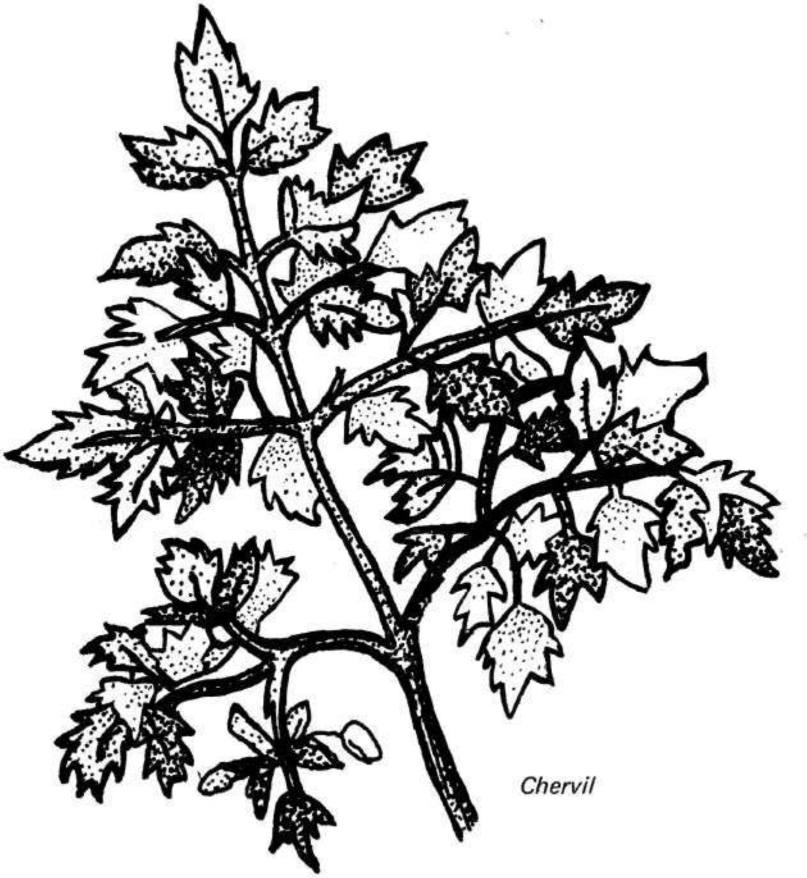
Chervil is a hardy annual of the parsley family, and its lacy, bright green leaves resemble those of parsley, although its flavor is more subtle. The plant grows one to two feet tall, and the tiny white flowers appear in umbels—umbrellalike clusters. In folk medicine, chervil was soaked in vinegar and the liquid administered as a cure for hiccups.

Where and when to grow

Chervil prefers a cool climate, but will grow anywhere in the United States. Plant it early in spring.

How to plant

Chervil grows best in a moist and partially shaded environment. When you're preparing the soil, dig in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet. In spring.



Chervil

about the average date of last frost, plant chervil seeds half an Inch deep In rows 18 to 24 inches apart. When the plants are six weeks old, thin them to stand three to four inches apart. To encourage thicker foliage, cut the flower stems before they bloom.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Part 1.

For best growth, keep chervil moist.

Pests

Chervil is a member of the parsley family, so you may encounter an occasional parsley caterpillar. Hand-pick it off the plant.

Diseases

Chervil has no serious disease problems.

When and how to harvest

Pick fresh leaves as you need them during the growing season. In the fall before a hard frost, harvest all the stems and leaves and dry them rapidly in a shady area.

Storing and preserving

Store crushed dry leaves in a tightly sealed container. You can also freeze the leaves. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Add fresh chervil leaves to salads; it also makes an attractive alternative to parsley as a garnish. Chervil is an especially appropriate seasoning for fish, chicken, and egg dishes.

Chives

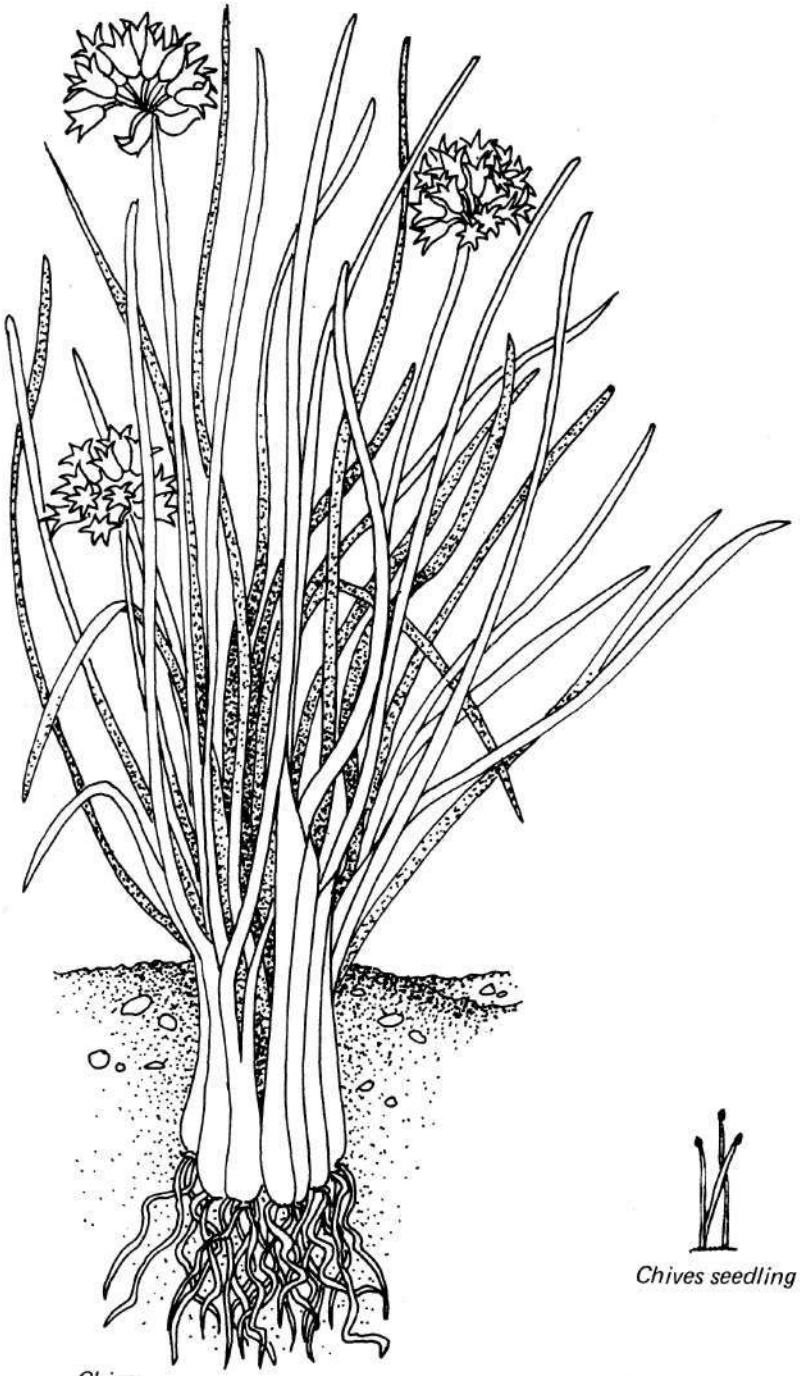
Common name: chives
Botanical name: Allium schoenoprasum
Origin: Europe

Varieties

Few varieties are available; grow the variety available in your area.

Description

This hardy perennial relative of the onion has tufts of thin hollow leaves six to 10 inches long. In the late spring, it produces striking flowers — rounded soft purple globes. The chive blossom appears, dried or fresh, in many



Chives

Chives seedling

Japanese dishes. Chives are perennials that will remain in your garden for years once they're established.

Where and when to grow

Chives are hardy and will grow anywhere in the United States. They do well in cool weather but can survive extremes of temperature.

How to plant

You can grow chives from seed or divisions — small bulbs separated from clumps. The seeds take a long time to germinate and need a very cool temperature, not above 60°F; after their slow start they grow quickly. Plant either seeds or divisions about four to six weeks before your average date of last frost — a late frost won't hurt them. Chives tolerate partial shade, and prefer sandy soil with plenty of organic matter — this is important for perennial herbs — and good drainage. When you're preparing the soil, dig in a low nitrogen (5-10-10) fertilizer at the rate of a half pound per 100 square feet. Plant seeds a quarter inch deep in rows 12 inches apart. The plants can be fairly close together; small clumps (25 plants) can be set out six to eight inches apart in rows. They'll fill in and make an attractive array.

Fertilizing and watering

Don't fertilize chive plants at midseason. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Part 1.

Watering is important for good growth; the plants will survive neglect, but if you let the

soil dry out, the tips of the leaves — the part you want to eat—will become brown and unappetizing.

Special handling

Chives will take care of themselves without much help from you. Separate the clumps from time to time. If you grow chives indoors, grow several pots so you can take turns clipping from them when you need chives for cooking and flavoring.

Pests

Chives are trouble-free. Onion thrips may be a problem in a commercial onion-producing area, but they shouldn't bother plants that have enough water.

Diseases

Chives have no serious disease problems.

When and how to harvest

If you start from seed, you can start snipping chives after 90 days; from transplanted divisions, after 60 days. Either way, the plants will produce much better the second year. To harvest, it's usual to just snip the tops off the leaves, but if you harvest from the base you'll avoid unattractive stubble.

Storing and preserving

If you're growing chives on the windowsill or on the border of your flowerbed, you may not need to store any — you've got a regular supply right there. However, chives can be satisfactorily frozen or dried. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Try a little chopped chives and parsley in an omelette — it's quick and a little different for breakfast. Used raw, chives add a mild onion flavor to any dish. They are often mixed with cottage cheese, sour cream, or cream cheese. The blossoms can be eaten too and are best when just coming into bloom.

Coriander

Common name: coriander
Botanical name: Coriandrum sativum
Origin: Europe, Asia Minor, and Russia

Coriander

Varieties

Few varieties are available; grow the variety available in your area.

Description

Coriander is a fast-growing annual that grows to about 12 to 18 inches in height. It has tall slender stems with fine feathery leaves; the flowers are pale pink and grow in clusters. The seeds are used for flavoring candies, sauces, and soups. Coriander has a strong odor that many people don't like; it's one of the oldest known herbs. It was grown in ancient Egyptian gardens, and its seeds have been found in Egyptian tombs. Coriander is also mentioned as a food source in the Old Testament. The Spanish for coriander is *cilantro,* and the herb is sometimes known by this name.

Where and when to grow

Coriander grows almost anywhere that has a growing season of at least 100 days. It's not very hardy and will not survive hard frost, so plant it in the spring after all danger of frost has passed.

How to plant

Coriander grows best in a fertile, well-drained soil. It prefers a sunny location but will survive in a slightly shaded area. When you're preparing the soil, dig in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet. Plant coriander from seed in the early spring, two to three weeks after the average date of last frost. Plant the seeds a quarter inch deep in rows eight to 12 inches apart, and thin the plants to stand 12 inches apart when the seedlings are growing strongly.

Fertilizing and watering

Do not fertilize coriander at midseason. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Part 1.

Coriander should be kept evenly moist throughout the growing season, but when the seeds are nearing maturity too much rain can reduce the yield.

Pests

Coriander has no serious pest problems.

Diseases

Coriander has no serious disease problems.

How to harvest

You can pick a few coriander leaves any time after the plants are about six inches tall — the fresh leaves are known as cilantro. Harvest the coriander seeds when they turn a light brown, two to three weeks after flowering. The seeds are small — only an eighth inch in diameter — and are split in half and dried after harvesting.

Storing and preserving

The dried seeds can be stored for months in an airtight container. You can freeze or dry the leaves. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Add a little coriander to guacamole or to Chinese soups. The dried seeds are good in bread, cookies, potato salad, and fruit dishes. Coriander is used a lot in sausages.

Dill

Common name: dill
Botanical name: Anethum graveolens
Origin: Southeast Europe

Varieties

Few varieties are available; grow the variety available in your area. Bouquet is a dwarf variety.

Description

Dill, a member of the parsley family, is a biennial grown as an annual and grows two to four feet tall. Dill has finely cut leaves and small yellow flowers growing in a fiat-topped cluster; it has a delicate feathery look and makes a good background for flowers or vegetables. Carrying a bag of dry dill over the heart is supposed to ward off the evil eye. Dill water was once used to quiet babies and get rid of gas.

Dill seedling

where and when to grow

Dill, like most herbs, can be grown pretty much anywhere, and can withstand heat or cold. Grow it from seed sown in the spring or fall. Once established, dill will seed itself and return year after year.

How to plant

Poor, sandy soil is an advantage when you're growing dill — the herb will have stronger flavor — but the soil must drain well. Dill will tolerate partial shade; in light shade the plants won't get as bushy as in full sun, so they can be closer together. Plant the seeds two or three weeks before your average date of last frost in rows two to three feet apart; they germinate quickly. When the seedlings are growing well, thin them to 12 inches apart. You can also thin dill to form a clump or mass rather than a row. Make sure you know where you want the plants, because dill has a taproot and is not easy to transplant. Dill is short-lived, so make successive sowings to give you a continuous crop.

Dill

Fertilizing and watering

Fertilizing is unnecessary for dill. Detailed information on fertilizing is given in "Spadework: The Essentia! Soil" in Parti.

It doesn't need too much water and seems to do better if it's kept on the dry side.

Special handling

The stems are tall and fine; you may need to stake them.

Pests

Dili, like most herbs, is a good choice for the organic gardener. It's a member of the parsley family, so you may encounter a parsley caterpillar; hand-pick it off the plant.

Diseases

Dill has no serious disease problems.

When and how to harvest

Time from planting to harvest is 70 days for foliage, 90 days for seeds. To harvest, snip off the leaves or young flower heads for use in soups or salads. For

pickling, cut whole stalks when the plant is more mature. Gather the mature seeds for planting (although the dill will do its own planting without your help if you leave it alone) or for drying.

Storing and preserving

Dill seeds can be sprouted if they are allowed to dry naturally; store the dried seeds in an airtight jar. Crumble the dried leaves, and store them the same way. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Dill pickles, obviously. You can also make a marvelous leek and potato soup seasoned with dill, and dill adds a new kick to rye bread. Dill Is very good with fish or potatoes, and you can use it for garnish if you run out of (or are bored with) parsley.

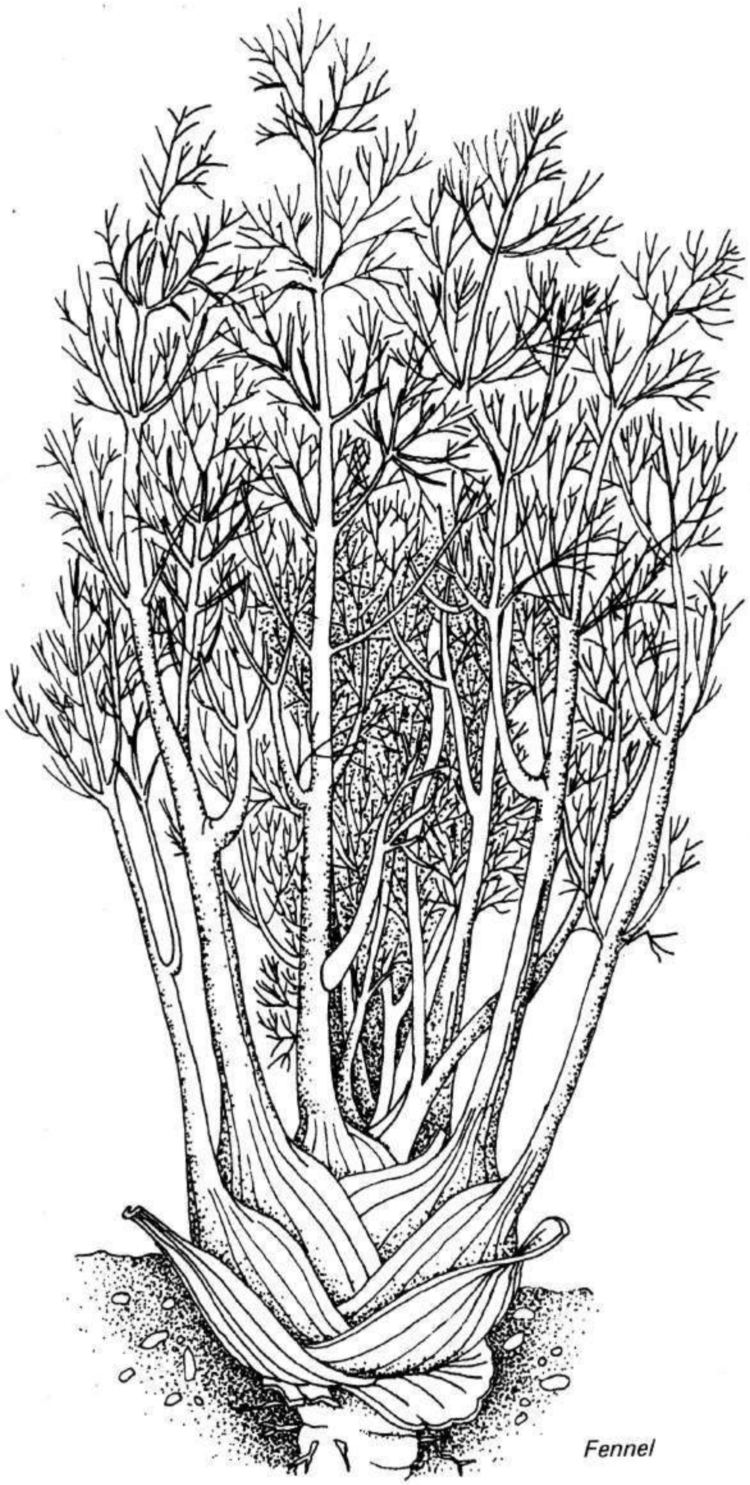
Fennel

Common names: fennel, Florence fennel, finnochio
Botanical name: Foeniculum vulgaredulce
Origin: Mediterranean

Varieties
Few varieties are available; grow the variety available in your area.

Description

Fennel is a stocky perennial grown as an annual, and looks a bit



Fennel

like celery with very feathery leaves. Ordinary fennel (F. vulgare) is also a perennial. Its leaves are picked for soups, sauces, and salads. The whole herb has an anise flavor. The plant will grow four to five feet tall, and the small, golden flowers appear in flat-topped clusters from July to September. A variant called "Copper" has charcoal-gray foliage and makes an interesting contrast to other colors in a flower bed. In folk medicine all sorts of good results have been attributed to fennel; at one time or another it has been credited with sharpening the eyesight, stopping hiccups, promoting weight loss, freeing a person from "loathings" and acting as an aphrodisiac.

Where and when to grow

Fennel will grow anywhere, and tolerates both heat and cold. Grow it from seed sown two to three weeks before your average date of last frost.

How to plant

Like most herbs, fennel needs well-drained soil that is high in organic matter. Plant seeds in full sun, in rows two to three feet apart. When seedlings are growing strongly, thin them to stand 12 inches apart. Fennel is a difficult herb to transplant because of its taproot.

Fertilizing and watering

Do not fertilize fennel. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Keep fennel on the dry side; it just needs enough moisture to keep it going.

Fennel seedling

Special handling

The plants grow four to five feet tall; you may need to stake them.

Pests

Since fennel is a member of the parsley family, the parsley caterpillar may appear. Remove it by hand. Like most herbs, fennel is a successful bet for the organic gardener.

Diseases

Fennel has no serious disease problems.

When and how to harvest

You can start harvesting a few leaves as soon as the plant is well-established and growing steadily; use them for flavoring. Harvest the bulbous stalk when it is three inches or more in diameter for use as a vegetable.

Storing and preserving

The leaves of fennel can be frozen or dried. Crumble the dried leaves, and store them in an airtight container. Detailed information on storing and preserving is given in Part 3. You'll probably want to eat the stalks fresh, but they can also be frozen.

Serving suggestions

Fennel is featured in many Italian dishes. The leaves add flavor to soups and casseroles, and fennel is a good seasoning with fish. Add the seeds to rye bread or a creamed cheese spread.

Garlic

Common name: garlic
Botanical name: Allium sativum
Origin: South Europe

Varieties

Few varieties are available; grow the variety available in your area.

Description

Garlic is a hardy perennial plant that looks a lot like an onion, except that the bulb is segmented into cloves. The flower head looks like a tissue paper dunce cap and is filled with small flowers and bulblets. There is an old story that when the Devil walked out of the Garden of Eden after the fall of Adam and Eve, onions sprang up from his right hoof-print and garlic from his left.

Where and when to grow

Garlic must have cool temperatures during its early

Garlic

growth period, but it's not affected by heat in the later stages. Plant garlic in spring in the North; in the South you can get good results with fall plantings.

How to plant

You grow garlic from cloves or bulblets, which are planted with the plump side down. Use the plumpest cloves for cooking and plant the others. They need full sun and well-worked soil that drains well and is high in organic matter. Do not fertilize the soil. Plant the cloves four to six weeks before the average date of last frost. Plant them an inch or two deep, four to six inches apart, in rows about a foot apart.

Fertilizing and watering

The organic content of the soil is important, but fertilizing isn't; don't fertilize because it will decrease the flavor of the garlic bulbs. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Part 1.

Keep the garlic slightly dry, especially when the bulbs are near maturity; this also improves the flavor. Keep the area cultivated.

Pests

Occasionally onion thrips may attack garlic, but they don't constitute a real problem; hose them off the plants if they do appear. Garlic is a good crop for the organic gardener. Detailed information on pest control is given in "Keeping Your Garden Healthy" in Parti.

Disease

Mildew may occur in a warm, moist environment, but it's not

Garlic seedling

common enough to be a problem. Keep the garlic fairly dry.

When and how to harvest

Harvest the bulbs when the tops start to dry—that's the sign that the bulbs are mature.

Storing and preserving

Store the mature bulbs under cool, dry conditions. Braid the tops of the plants together with twine and hang them to dry — very Gallic; in France you can still see rural vendors on bicycles with strings of garlic slung over their handlebars. Detailed information on storing and preserving is given in Parts.

Serving suggestions

Garlic is indispensable to French cooking, and its use is now generally accepted in this country. If you still know anyone who disapproves of the strong flavor of garlic, try to convert him—he'll thank you later. Spice up your next spaghetti dinner with garlic bread. Rub a salad bowl with a cut clove of garlic before tossing the salad. Add a clove of garlic to a homemade vinaigrette; let the dressing stand for a while before use if you like your salad good and garlicky. Insert slivers of garlic into small slits in a roast, or rub a cut clove over a steak before grilling.

Marjoram

Common names: marjoram, sweet marjoram
Botanical name: Marjorana hortensis
Origin: Mediterranean

Marjoram

Varieties

Few varieties are available; grow the variety available in your area.

Description

A tender branching perennial, usually grown as an annual, marjoram grows 10 to 15 inches tall. It has greyish opposite leaves and lavender or whitish flowers growing up most of the stem. Marjoram means "joy of the mountain." Venus was reputed to be the first to grow this herb. Its leaves and flowering heads, steeped and made into a tea, have been said to relieve indigestion and headaches.

Where and when to grow

Marjoram will grow in most areas of the United States, but it's sensitive to frost and needs winter protection to survive the winter in very cold areas. Plant marjoram from seeds or transplants on your average date of last frost.

How to plant

Marjoram tolerates light shade and thrives in poor soil with good drainage. Don't fertilize the soil before planting; over-fertile soil will produce lots of leaves, but they'll have little flavor. One of the attractive qualities of many herbs is that they'll thrive in the kind of soil conditions that a lot of Other plants won't tolerate. Marjoram is started from seed or transplants. On your average date of last

frost, sow seeds a quarter inch deep in rows 18 to 24 inches apart. Thin the seedlings about six inches apart when they're growing sturdily, or plant transplants that are two or three inches tall, and set them about six inches apart. If the weather warms up quickly, mulch transplants to protect the roots from too much heat until they're acclimated. If you're afraid marjoram won't survive the winter, dig up the plants in the fall, let them winter as houseplants, and plant again in spring — divide the clumps before replanting.

Fertilizing and watering

Don't fertilize marjoram. Detailed information about fertilizing is given in "Spadework: The Essential Soil" in Parti.

Water sparingly. The less water marjoram gets, the better the flavor will be.

Special handling

About all the special attention marjoram requires is a protection of mulch to help it weather very cold winters.

Pests

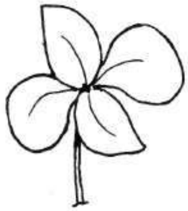
Marjoram has no serious pest problems. Like most herbs, it's a good plant for organic gardens.

Diseases

Marjoram has no serious disease problems.

When and how to harvest

When the first blooms appear, cut the plants back several inches; you can do this several times without harming the plant. Fresh leaves can be harvested at any time.



Marjoram seedling

Storing and preserving

Dry leaves and flower tops quickly. Store the crumbled, dry leaves for winter use. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Marjoram is one of the traditional components of a *bouquet garni.* The leaves are good with veal and liver, in meat and egg dishes, and in poultry stuffings. Try them in soups or on roast beef sandwiches. Make herb butter with them. Add chopped marjoram leaves in melted butter to spinach just before serving.

Mint

Common name: mint
Botanical names: Mentha piperita (peppermint); Mentha spicata (spearmint).
Origin: Europe

Varieties

There are many varieties of mint, of which the best known are spearmint and peppermint. Other varieties have different flavors, like golden apple mint or orange mint. Grow the variety available in your area or the scent and flavor you like best.

Description

A number of different varieties go by the collective name of mint; peppermint and spearmint are probably the two most popular. Both are hardy perennials, and both are very prolific—once you set them in a corner of the garden they'll quietly take over. Peppermint (Mentha piperita) is a tall, shallow-rooted, fast-spreading perennial with square stems and leaves that usually have a purple tinge. The light lavender flowers appear in terminal spikes and bloom through most of the growing season. The plant grows to about three feet tall. Spearmint (M. spicata) is a perennial that grows two to 2y2 feet tall, with square stems and leaves that are slightly curled and deeply veined. The flowers are light purple to white and grow in spikes two to four inches long that start blooming in early summer and continue well into fall. You may also come across varieties like golden apple mint, which has a more delicate flavor than spearmint. This plant also has pale purple flowers, but the leaves are dark green streaked with gold. Orange mint, sometimes known as bergamot mint, gets its name from its delicate scent of oranges. Orange mint has reddish-green leaves edged with purple; the flowers are lavender.

where and when to grow

Both peppermint and spearmint are very hardy and can be grown almost anywhere in the United States. Plant them from root divisions any time during the growing season.

How to plant

Mint varieties from seed will not grow "true." So it's generally more satisfactory to use root divisions. An innocuous little plant of mint will wander all over the garden if it gets half a chance, so plant each one in a container that will keep the roots in one place — a two-pound coffee can with both ends removed is good.
Peppermint and spearmint grow well in any soil; they prefer sun but will tolerate partial shade. For spearmint, work a complete, well-balanced fertilizer into the soil before planting at the rate of a pound per 100 square feet.
Don't fertilize before planting peppermint—you'll get all the peppermint you can use without it.
Although you can plant mints anytime during the growing season, root divisions will be established faster if planted on a cool, moist day in spring or fall.
Space plants two or three inches apart in rows 18 to 24 inches apart.

Fertilizing and watering

Don't fertilize mints in midseason; they'll never miss it. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Both peppermint and spearmint prefer moist soil, so they'll require more watering than the rest of the garden. Keep them evenly moist until root divisions are established.

Pests

Mints have no serious pest problems.

Diseases

Mints are susceptible to verticillium wilt and mint rust. Prevent these diseases by removing all the dead stems and leaves from the bed before winter. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Part 1.

When and how to harvest

The more mint you pick, the better the plants will grow, and you can pick sprigs throughout the growing season. Harvest more fully as the plants begin to

Mint

bloom, just as the lower leaves start to yellow. Cut the entire plant down two or three inches above the soil. You'll get a second smaller harvest the same season.

Storing and preserving

Strip the mint leaves from the stem and let them dry in a warm shady area. The dried leaves can be stored in a sealed jar. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

A sprig of fresh mint is a pretty garnish for summer drinks — and you can't have a mint julep without it. Cook peas in a very little water to which you've added a couple of sprigs of mint. Toss boiled new potatoes with butter and chopped mint—a nice change from parsley. Instead of mint jelly with a lamb roast, try the traditional English mint sauce. Add a little sugar to a couple of tablespoons of chopped fresh mint leaves, add boiling water to bring out the flavor, then top off with vinegar to taste.

Oregano

Oregano

Common names: oregano, wild marjoram
Botanical names: Origanum vulgare. Origanum heracleoticum
Origin: Mediterranean (O. vulgare), Cyprus (O. heracleoticum)

Varieties
In cold northern areas grow any variety of O. vulgare. In warmer areas grow any variety of either O. vulgare or O. heracleoticum.

Description

The name "oregano" is more accurately applied to a flavor than to a plant, and there are two varieties that you can grow for seasoning called oregano. O. vulgare is usually grown; it's hardier and easier to propagate than the alternative, O. heracleoticum—also known as wild marjoram. The name "oregano" itself has been traced back to an ancient Greek word translated as "delight of the mountains," which suggests that the plants once grew wild on the hillsides of Greece. Oregano (O. vulgare) is a very hardy perennial that may grow2y2 feet tall.

The leaves are greyish-green, slightly hairy, and oval in

shape, and the flowers are pink, white, or purple. O. heracleoticum is a tender perennial that grows only a foot high. The leaves are very hairy and oval in shape, and the plant bears small white flower clusters on tall stems. Oregano's reputed medicinal powers are varied. A tea made from the leaves and flowers was believed to relieve indigestion, headaches, and nervousness. Oil extracted from the plant was used as a cure for toothache.

Where and when to grow

O. vulgare can be grown anywhere in the United States from root divisions or seed planted early in spring. O. heracleoticum can also be grown anywhere in the United States from seed or root divisions if planting is delayed until all danger of frost is past; it should be grown as an annual or given winter protection in colder northern areas. O. heracleoticum can also be grown in a container — it makes an attractive houseplant.

How to plant

Don't fertilize the planting bed for oregano—lack of nutrients even enhances the flavor. Both varieties need well-drained soil in a sunny location, although O. vulgare will tolerate partial shade. Plant both varieties from root divisions or seeds and space plants about a foot apart. Plant O. vulgare on your average date of last frost, and O. heracleoticum two to three weeks later. Plant seeds a quarter inch deep in rows 12 to 18 inches apart, and thin to six to 12 inches apart. Plant divisions six to 12 inches apart in rows 12 to 18 inches apart.

Fertilizing and watering

Don't fertilize oregano at all. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Keep the oregano plants on the dry side.

Pests

Oregano varieties have no serious pest problems.

Diseases

These plants have no serious disease problems.

When and how to harvest

Oregano is ready to harvest when it begins to flower; cut the stems down to a few inches above the soil. Leaves can be harvested for fresh use throughout the growing season if you cut off the flowers before they open—this encourages fuller foliage.

Storing and preserving

Hang oregano in bunches to dry; when they're dry, remove the leaves and store them in an airtight container. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Oregano is essential to lots of Italian dishes. Add it to spaghetti sauce, and sprinkle it on pizza. Try oregano and a touch of lemon on lamb chops or steak. Sprinkle oregano on cooked vegetables for a lively flavor.

Parsley

Common name: parsley
Botanical name: Petroselinum crispum
Origin: Mediterranean

Varieties

Moss Curled (70 days); Perfection (75 days); Hamburg or Parsnip-Rooted parsley (90 days).

Description

Parsley is a hardy biennial that is treated as an annual. It has finely divided, fernlike leaves that are either flat or curly. The leaves grow in a rosette from a single taproot that in some varieties is quite large and can be eaten like parsnips. Parsley has flat-topped clusters of greenish-yellow flowers, similar to those of dill, which belongs to the same family. The Romans wore parsley wreaths to keep from becoming intoxicated. Parsley is probably the best known of the herbs used for flavoring and for garnish.

Where and when to grow

Parsley will grow anywhere and can survive cold. It tolerates heat, but very hot weather will make the plant go to seed. Plant parsley

Parsley seedling

two to three weeks before your average date of last frost. Parsley also does well as a houseplant; some gardeners bring parsley in from the garden in fall and let it winter in a bright window.

Parsley

How to plant

Parsley likes well-worked, well-drained soil with moderate organic content. Don't fertilize before planting. Plant it from seed; they take a long time to germinate, but you can speed up the process by soaking them in warm water overnight before planting. Plant the seeds a quarter-inch deep in rows 18 to 24 inches apart. Thin the seedlings to 12 to 18 inches apart when they're growing strongly. Or start seeds indoors six weeks before the average date of last frost.

Fertilizing and watering

You don't need to fertilize the soil for parsley to grow well. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

It's important to keep the soil moderately moist; parsley needs a regular supply of water to keep producing new leaves.

Pests

The parsley caterpillar is the only pest you're likely to have to contend with. Hand-pick it off the plants.

Diseases

Parsley has no serious disease problems.

When and how to harvest

From planting to harvest is about 70 to 90 days, and a 10-foot row of parsley will keep you — and all your neighbors — well supplied. To encourage the growth of new foliage, cut off the flower stalk when it appears. The flower stalk shoots' up taller than the leaves, and the leaves on it are much smaller. Harvest parsley leaves any time during the growing season; cut them off at the base of the plant. The plant will retain its rich color until early winter. Many gardeners harvest the entire parsley plant in fall

and dry it; you can also bring the whole plant inside for the winter.

Storing and preserving

Parsley lends itself well to freezing and drying. Store the dried leaves in an airtight container. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Parsley's reputation as a garnish often does it a disservice—it gets left on the side of the plate. In fact it's been known for thousands of years for its excellent flavor and versatility. Add chopped parsley to buttered potatoes and vegetables; toss a little on a sliced tomato salad along with a pinch of basil. Add it to scrambled eggs or an omelette aux fine herbs. Parsley is a natural breath-freshener.

Rosemary

Rosemary

Common name: rosemary
Botanical name: Rosemarinus officinalis
Origin: Mediterranean

Varieties

Albus; Collingwood Ingram; Tuscan Blue; Prostratus; Lockwood de Forest.

Description

Rosemary is a half-hardy, evergreen, perennial shrub with narrow, aromatic, grey-green leaves. It can grow six feet tall, anc the flowers are small, light blue or white. It's a perennial, but in areas with very cold winters it's grown as an annual. Rosemary is one of the traditional strewing herbs; in the language of flowers its message is "remember." In Shakespeare's play, Ophelia gives Hamlet a sprig of rosemary "for remembrance." Keep up the old tradition of a herb of remembrance by tying a sprig of rosemary to a gift.

Where and when to grow

Rosemary can handle temperatures a bit below freezing and tolerates cold better in a sandy, well-drained location. Less-

Rosemary seedling

than-Ideal conditions improve its fragrance, but it's not really hardy north of Washington, D.C. Grow it in a cold-winter area if you're willing to mulch it for winter protection.

How to plant

Like most herbs, rosemary is most fragrant and full of flavor if it's grown in well-drained, sandy soil that's high in organic matter but not over-rich. Very fertile soil will produce beautiful plants but decrease the production of the aromatic oils on which the plant's fragrance depends. Don't fertilize the soil if you're planting rosemary, except if you're growing it as a perennial in a mild winter climate; in this case, work a low-nitrogen (5-10-10) fertilizer into the soil before planting at the rate of about a half pound to 100 square feet. To grow rosemary from seed, start the seeds indoors or in a cold frame four to six weeks before your average date of last frost. Two weeks after the average date of last frost, transplant them to a location in full sun with a foot or more between the plants and 18 to 24 inches between rows. You can also grow rosemary from stem cuttings. Pot a rosemary plant from the garden in fall and bring it into the house for winter use. In the spring take stem cuttings to propagate your new crop.

Fertilizing and watering

Do not fertilize at midseason. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Part 1.

If the weather is dry, water regularly to keep the soil moist. Don't let the roots dry out.

Pests

Rosemary has no serious pest problems. Like most herbs, it does well In the organic garden.

Diseases

Rosemary has no serious disease problems.

When and how to harvest

You can take some of the leaves, which look like short pine needles, and use them fresh any time you want them. Growth can be pruned back several times during a season.

Storing and preserving

Dry the leaves and store them in airtight containers. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Treat rosemary with respect; it can easily overpower more delicate herbs. Rosemary is traditionally used with lamb or pork; it's also excellent combined with a little lemon juice and chopped parsley and sprinkled on chicken before it's baked.

Sage

Common name: sage
Botanical name: Salvia officinalis
Origin: Mediterranean

Varieties

Albiflora (white flowers); Aurea (variegated leaves); Purpurea (reddish-purple upper leaves).

Description

Sage is a hardy, perennial shrub that grows to two feet tall and gets quite woody. The leaves are oval, sometimes five inches long. Gray leaves are more common but several varieties have variegated leaf color. The flowers are bluish-lavender and grow on spikelike stems. Traditionally, sage water is supposed to improve the memory and keep the hair from falling out. The purple or golden varieties make delightful ornamental houseplants. They're smaller plants than the

Sage seedling

green or gray varieties^ but they're prettier, and the flavor is just as good. Most garden shops and catalog lists offer only the gray varieties. Go to a herb specialist for the less common types.

Where and when to grow

Sage, like most herbs, is an accommodating plant that will grow anywhere. In northern areas, mulch to help the plants survive the winter.

How to plant

Sage can be reproduced by layering, by division, or by using stem cuttings. You can also start it from seed. Sage thrives in poor soil as long as the drainage Is good, and it's not normally necessary to fertilize—if the soil is too rich the flavo rwill be poorer. If you're planting sage as a perennial, fertilize the first year only with a low-nitrogen fertilizer. When you're preparing the soil for planting, work a 5-10-10 fertilizer into the soil at the rate of half a pound per 100 square feet. Plant sage seeds or divisions on your average date of last frost. Plant seeds a quarter inch deep in rows 18 to 24 inches apart, and thin to 12 inches apart. Plant divisions or cuttings 12 inches apart in rows 18 to 24 inches apart. They should be in full sun; the plant will tolerate partial shade, but the flavor will be impaired.

Fertilizing and watering

Don't fertilize at midseason. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Keep sage plants on the dry side.

Pests

Sage has no serious pest problems. Like most herbs. It does well in the organic garden.

Diseases

Sage has no serious disease problems. If the area is too damp or shady rot may occur. Avoid this by planting sage in a dry, sunny location. Detailed information on disease prevention is given in "Keeping Your Garden Healthy" in Parti.

When **and** how to harvest

Sage takes 75 days from planting to harvest, and a few plants will supply you and a lot of other people, too. At least twice during the growing season, cut six to eight inches from the top of the plants. Pick the leaves as desired as long as you don't cut back more

Sage

than half the plant—if you do it will stop producing.

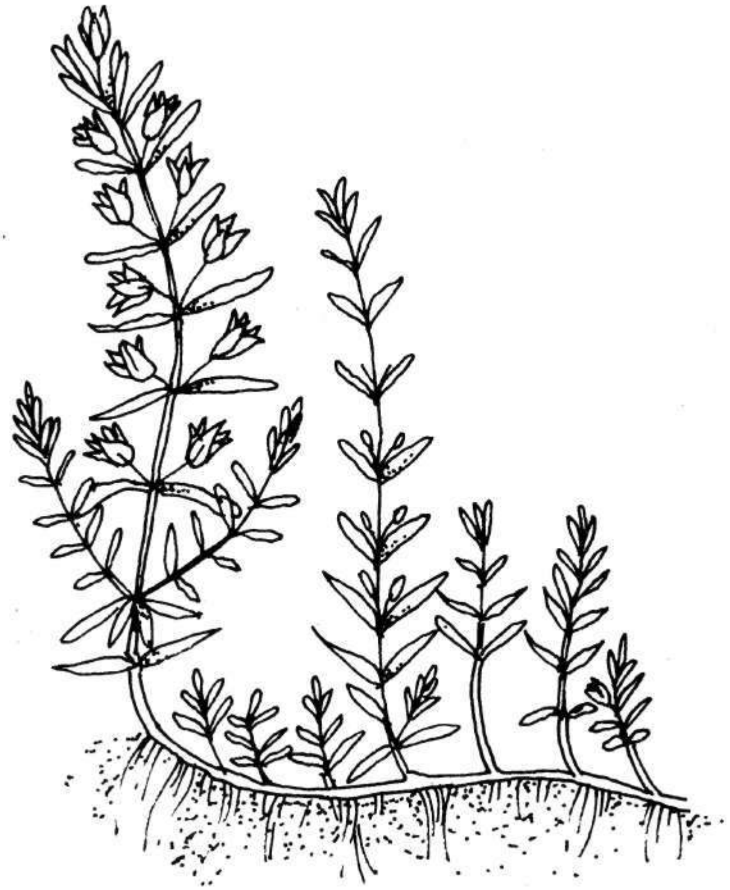
Storing and preserving

Store dried sage leaves in an airtight container. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Sage and onion make a good combination and are traditionally used together in stuffings for pork, turkey, or duck. Sage can overwhelm other seasonings, so handle it with care. Some people steep dried sage leaves to make a herb tea.

Savory



Savory

Common names: summer savory, winter savory
Botanical names: Satureja hortensis (summer savory); Satureja montana (winter savory)
Origin: Mediterranean, Southern Europe

Varieties

Few varieties are available; grow the variety available in your area.

Description

Both types of savory belong to the mint family. Summer savory is a bushy annual with needle-shaped leaves and stems that are square when the plant is young and become woody later. The flowers are light purple to pink, and the plant grows to a height of about 18 inches. Winter savory is a bushy hardy perennial that grows about a foot tall. The small flowers are white or purple and, like the summer variety, winter savory has needle-shaped leaves and square stems that become woody as they develop. The winter variety has sharper-flavored leaves than the summer kind.

Where and when to grow

Both varieties grow anywhere in the United States from seeds planted two to three weeks after the average date of last frost.

How to plant

Summer savory can be grown in almost any soil; winter savory prefers soil that is sandy and well-drained. Both need full sun. Before planting, work a complete, well-balanced fertilizer into the ground at the rate of one pound to 100 square feet. Plant seeds of both summer and winter varieties half an inch deep in rows 12 to 18 inches apart. When the seedlings are four to six weeks old thin summer savory plants to stand three to four inches apart. Winter savory needs more room;

thin the plants to 12 to 18 inches apart.

Fertilizing and watering

Do not fertilize at midseason. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.
Both varieties do better if kept on the dry side.

Special handling

Summer savory has a tendency to get top-heavy; stake the plants if necessary.

Pests

Savory has no serious pest problems.

Diseases

Savory has no serious disease problems.

When and how to harvest

Pick fresh leaves and stems of both summer and winter savory at any time during the growing season. In areas with a long growing season you may get two harvests. For drying, cut off the top six to eight inches of the plant as soon as it begins to flower.

Storing and preserving

Store the dried leaves in an airtight container. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Savory has a peppery flavor that is good with fish, poultry, and in egg dishes. Try it in vinegars, or add a little to a cheese souffle.

Sesame

Common name: sesame
Botanical name: Sesamum indicum
Origin: Africa

Varieties

Few varieties are available; grow the variety available in your area.

Description

Sesame is a hardy annual that has a unique drought-tolerant root system composed of a long taproot and a large number of fibrous secondary roots. It's an attractive plant, with cream or pale orchid-colored flowers that grow in the angles of the leaves. Sesame used to be credited with magic powers and was associated with Hecate, queen of witches. Its uses today are less dramatic; the dried seeds are used to flavor breads, candy, and baked goods, and the oil extracted from the

Sesame

seeds is used for cooking and in salad dressings.

Where and when to grow

Sesame is easy to grow if you can give it a growing season of about 120 days; it grows well in the warm, dry areas of the South and Southwest. Plant it when danger of frost is over.

How to plant

Give sesame a place in the sun in well-drained, fertile soil. When you're preparing the soil, dig in a complete, well-balanced fertilizer at the rate of one pound per 100 square feet. Four to six weeks after the average date of last frost, plant the seeds a half inch deep in rows 12 to 18 inches apart. Thin the plants to 12 to 18 inches apart when they are four to five weeks old.

Fertilizing and watering

Fertilize before planting and again at midseason, at the same rate as the rest of the garden. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Allow the plants to dry out between waterings.

Pests

Sesame has no serious pest problems.

Diseases

Sesame has no serious disease problems.

When and how to harvest

Harvest about 90 to 120 days after planting when the mature seed pods are about the size of a peanut. Crack the pods open carefully, and remove the seeds.

Storing and preserving

Store the dried sesame seeds in an airtight container. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Toast sesame seeds and toss them over vegetable dishes or soups. They give an extra crunch to pan-fried fish. Or, just eat the roasted seeds as a snack. Sesame is used a lot in Oriental dishes and the seeds, untoasted, are added to cookies, cakes, and breads before baking.

Tarragon

Common name: tarragon
Botanical name: Artemisia dracunulus
Origin: Caspian Sea, Siberia

Varieties

Few varieties are available. Grow the variety available in your area, but try to make sure that it's the French, not the Russian, kind.

Description

Tarragon is a half-hardy perennial that grows two to four feet tall; it has slender stems and thin narrow leaves that taste a bit like licorice, and it rarely produces flowers—they're small and whitish in color. True French tarragon is a sterile clove and cannot be grown from seed; use rooted divisions or stem cuttings. There is also a Russian variety of tarragon, which has a stronger flavor that most people don't like. Many herbs are decorative, but tarragon is not glamorous. However, its finely textured dark-green foliage makes an attractive background for small, bright flowers. The word tarragon comes from the Arabic word for dragon. The French translation, *estragon* (little dragon), might reflect either the way tarragon was used medicinally to fight pestilence during the Middle Ages, or the snakelike appearance of its roots.

Where and when to grow

Tarragon can be grown anywhere in the United States and will survive cold winters if it's given adequate protection. It's hardy in well-drained, sandy soils, but is less tolerant of cold in compacted or wet soil.

How to plant

Seeds of the Russian variety are available commercially, but are likely to produce plants of inferior flavor. Instead, use divisions or stem cuttings of French tarragon. Tarragon tolerates poor, rather dry soil. Fertilize the soil the first year only with a low-nitrogen (5-10-10) fertilizer; before planting, work the fertilizer well into the soil at the rate of a half pound to 100 square feet. Plant cuttings or divisions on your area's average date of last frost, and set them 18 to 24 inches apart in rows 24 to

36 inches apart. Give them a place in full sun; the plant will tolerate partial shade, but the flavor will be impaired.

Fertilizing and watering

Don't fertilize at midseason. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Keep tarragon on the dry side to encourage the flavor to develop.

Special handling

If you live in an area where the ground freezes and thaws often in the winter, mulch after the first freeze so that a thaw will not push the plant up and out of the ground. Mulching also helps the tarragon survive the cold. Subdivide the plants every three or four years.

Pests

Tarragon has no serious pest problems. It does well in the organic garden.

Diseases

Tarragon has no serious disease problems.

When and how to harvest

Time from planting to harvest is about 60 days, and you don't need a lot of tarragon. One plant supplies the average family, so if you're growing a lot you will be able to supply the whole neighborhood. Pick the tender top leaves of tarragon as you need them. Cut back the leafy top growth several times during the season to encourage the plant to bush out.

Tarragon

Tarragon seedling

storing and preserving

Tarragon is best fresh, but can be dried or frozen. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Put a fresh stem or two of tarragon into bottles of good cider vinegar or wine vinegar and, vo/7a, tarragon vinegar; allow a couple of weeks for the flavor to develop before you use it. Since the flavor of tarragon is so distinctive, use it with a light touch. Use the leaves to decorate cold dishes glazed with aspic. It's tarragon that gives a kick to a good *sauce tartare,* and, of course, you can't have chicken tarragon without it.

Thyme

Thyme

Common name: thyme
Botanical name: Thymus vulgaris
Origin: Mediterranean

Varieties
Argentens; Aureus; Rosens; Broadleaf English; Narrowleaf French.

Description

Thyme is a fragrant, small, perennial evergreen shrub with six- to eight-inch stems that often spread out over the ground. It's a member of the mint family and has square stems with small opposite leaves and pale lavender mintlike flowers. Thyme is a charming, cheerful little plant and will last for years once it's established. It's a good plant for a border or rock garden. There a more than 200 species and man^ hybrids, but the common form i

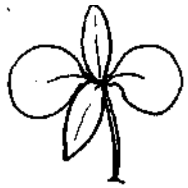
the one grown for flavoring. The Greeks and Romans believed that thyme gave courage and strength; their highest compliment was to tell a man that he smelled of thyme. In the Middle Ages ladies embroidered sprigs of thyme on the scarves they gave their knights. Linnaeus, the father of modern botany, recommended thyme as a hangover cure.

Where and when to grow

Thyme prefers a mild climate but can survive temperatures below freezing. It tolerates cold better in well-drained soil. Plant thyme from seed anywhere in the United States two to three weeks before your average date of last frost.

How to plant

Thyme likes well-drained soil, preferably low in fertility; rich soils produce plants that are large but less fragrant. The first year, work a low-nitrogen (5-10-10) fertilizer into the soil before planting at the rate of about a half pound per 100 square feet. This is generous of you, because in adverse soil conditions thyme, like many herbs, will have better flavor. Whatever the soil's like, it's important to give thyme a place in the sun. Plant seeds in early spring, two to three weeks before your average date of last



Thyme seedling

frost. Plant the seeds a quarter inch deep in rows 16 to 24 inches apart, and when the seedlings are two to three inches tall thin them about a foot apart. You can also plant thyme cuttings or root divisions. Plant them at the same time, and space them a foot apart.

Fertilizing and watering

Don't fertilize at midseason. Detailed information on fertilizing is given in "Spadework: The Essential Soil" in Parti.

Thyme seldom needs watering; it does best on the dry side.

Special handling

Some herbs, like mints, grow like weeds whatever the competition. Thyme can't handle competition, especially from grassy weeds, and needs an orderly environment; cultivate conscientiously.

Start new plants every three to four years, because thyme gets woody; reduce the clump greatly. If you've no room in the garden for extra plants, plant them in a hanging basket.

Pests

Thyme has no serious pest problems. Like most herbs, it's ideal for the organic gardener.

Diseases

Thyme has no serious disease problems.

When and how to harvest

Pick thyme as needed. For drying, harvest when the plants begin to bloom. Cut off the tops of the branches with four to five inches of flowering stems.

Storing and preserving

After drying, crumble the thyme and put into tightly capped jars. Detailed information on storing and preserving is given in Part 3.

Serving suggestions

Thyme is usually blended with other herbs and used in meat dishes, poultry, stuffings (parsley and thyme is a happy combination), and soups. It adds a nice flavor to clam chowder and is often used along with a bay leaf to give a delicate lift to a white sauce or a cheese souffle.

How to Store Vegetables

Once you've harvested your crops, you may find yourself with a big surplus. What do you do with all those vegetables? Well, you can — and will — enjoy them fresh; and you can also give a lot of them away. You can keep them in the refrigerator for a few days. You can freeze, can, or dry them for the months ahead, as detailed in the following chapters. But in some cases, cold storage — not freezing — can be your best bet. It's a low-effort, electricity-free choice that can keep you supplied with fresh vegetables all winter long. Both refrigerator storage and cold storage are discussed below, and the accompanying chart shows you which methods of storing or preserving work best for each vegetable.

Vegetable preserving methods

Vegetable	Cold Storage	Freezing	Canning	Drying
Artichoke	✓	✓	✓	
Asparagus		✓	✓	
Bean, broad	✓ (dried)	✓	✓	✓
Bean, dry	✓ (dried)	✓	✓	✓
Bean, green		✓	✓	✓
Bean, lima	✓ (dried)	✓	✓	✓
Bean, mung				✓
Beet				
root	✓	✓	✓	✓
greens		✓	✓	✓
Broccoli	✓	✓		
Brussels sprout	✓	✓		✓
Cabbage	✓	✓		✓
Cardoon	✓	✓	✓	✓
Carrot	✓	✓	✓	✓
Cauliflower	✓	✓	✓ (pickled)	✓
Celeriac	✓	✓		
Celery	✓	✓	✓	✓
Chard		✓	✓	✓
Chayote		✓		✓
Chick pea	✓ (dried)	✓	✓	✓
Chicory	✓			
Chinese cabbage	✓	✓		✓
Collard	✓	✓	✓	✓
Corn		✓	✓	✓
Cress, garden				
Cucumber			✓ (pickled)	
Dandelion				
Eggplant		✓		✓
Endive				
Fennel	✓	✓	✓	✓
Horseradish	✓	✓		✓
Jerusalem artichoke	✓	✓		
Kale	✓	✓	✓	✓
Kohlrabi	✓	✓		

Vegetable preserving methods continued

Vegetable	Cold Storage	Freezing	Canning	Drying
Leek	✔	✔		
Lentil	✔ (dried)	✔	✔	✔
Lettuce				
Mushroom		✔	✔	✔
Muskmelon	✔	✔	✔ (pickled)	
Mustard		✔	✔	✔
Okra		✔	✔	✔
Onion				
mature	✔	✔	✔	✔
green		✔		✔
Parsnip	✔	✔		
Peanut	✔ (dried)	✔	✔	✔
Pea	✔ (dried)	✔	✔	✔
Pea, black-eyed	✔ (dried)	✔	✔	✔
Pepper	✔	✔	✔	✔
Potato	✔	✔	✔	✔
Pumpkin	✔	✔		✔
Radish				
Rhubarb		✔	✔	✔
Rutabaga	✔	✔		
Salsify	✔	✔		
Shallot	✔	✔	✔	✔
Sorrel				
Soybean	✔ (dried)	✔	✔	✔
Spinach, New Zealand spinach		✔	✔	✔
Squash, summer		✔	✔	✔
Squash, winter	✔	✔		✔
Sweet potato	✔	✔	✔	✔
Tomato	✔ (green)	✔	✔	✔
Turnip				
root	✔	✔		
greens	✔	✔	✔	✔
Watermelon	✔	✔	✔ (pickled)	

SHORT-TERM REFRIGERATOR STORAGE

Most vegetables keep best for a short time when stored in the refrigerator, at a high humidity and a constant temperature, just above freezing. A temperature of about 40°F and a humidity of 95 percent are ideal for storing fresh vegetables, and these conditions are most likely to be found in the crisper or hydrator sections of the refrigerator. For the best results, the crisper should be at least two-thirds full; if it's empty or almost empty, vegetables placed in it will dry out.

To keep vegetables moist and fresh, follow these simple rules of refrigerator storage:

- Store vegetables in the crisper or hydrator, and keep the crisper full.
- When storing only a few vegetables, put them into airtight plastic bags or plastic containers, then into the crisper.
- When storing vegetables in other parts of the

refrigerator, put them into airtight plastic bags or plastic containers to prevent moisture loss.

Almost all vegetables store well in the refrigerator, but there are a few that don't. Mature onions, peanuts (dried), potatoes, sweet potatoes, pumpkins, winter squash, and such root vegetables as rutabagas, salsify, and turnips keep better in cold storage outside the refrigerator, in a basement storage room or root cellar. This type of storage is discussed in the next section. Most other vegetables, regardless of whether they *can* be kept in cold storage, keep very well for a short time in the refrigerator.

Preparing vegetables for refrigerator storage

Refrigerator storage is the simplest type of storage to prepare for — all you have to do is sort the vegetables, remove damaged or soft ones for immediate use or discard, and remove as much garden soil as you can. Some vegetables should be washed before they're stored; others keep better when they're not washe^d until you're ready to use them. The directions below tell you how to prepare each type of vegetable for refrigerator storage. For the best results, discard damaged vegetables or use them immediately; perfect vegetables keep best.

Artichokes

Do not wash until ready to use. Store in plastic bag up to 2 weeks.

Asparagus

Do not wash until ready to use. Slice off bottoms of stalks and stand upright in 1 to 2 inches of water. Store up to 1 week.

Beans, green or snap

Do not wash until ready to use. Store in plastic bag up to 1 week.

Beans, broad, dry, lima, or mung

Do not shell or wash until ready to use. Store in plastic bag up to 1 week.

Beets

Cut off tops, leaving about 1 inch of stem. Do not wash roots until ready to use. Store in plastic bag for 1 to 3 weeks. Wash greens thoroughly in cold water; drain well and store in plastic bag up to 1 week.

Broccoli

Do not wash until ready to use. Remove any damaged leaves. Store in plastic bag up to 1 week.

Brussels sprouts

Do not wash until ready to use. Remove any damaged leaves. Store in plastic bag up to 1 week.

Cabbage

Do not wash until ready to use. Remove any damaged leaves. Store in plastic bag for 1 to 2 weeks.

Cardoon

Trim roots and cut off leaves. Wash thoroughly in cold water; drain well. Store stalks attached to root in plastic bag for 1 to 2 weeks.

Carrots

Cut off tops. Wash thoroughly in cold water; drain well. Store in plastic bag for 1 to 3 weeks.

Cauliflower

Do not wash until ready to use. Remove any damaged leaves. Store in plastic bag up to 1 week.

Celeriac

Cut off leaves and root fibers. Do not wash until ready to use. Store in plastic bag up to 1 week.

Celery

Trim roots and wash thoroughly in cold water; drain well. Cut off leaves and store in plastic bag for 3 to 5 days. Store stalks attached at root in plastic bag fori to 2 weeks.

Chard

Wash thoroughly in cold water; drain well. Trim any bad spots on leaves and cut off tough stalks. Store in plastic bag for 1 to 2 weeks.

Chayote

Do not wash until ready to use. Store in plastic bag up to 1 week.

Chick peas

Do not shell or wash until ready to use. Store in plastic bag up to 1 week.

Chicory

Do not wash until ready to use. Store in plastic bag up to 1 week.

Chinese cabbage

Trim roots and wash thoroughly in cold waters-drain well. Store in plastic bag up to 1 week.

Collards

Wash thoroughly in cold water; drain well. Remove any damaged leaves. Store in plastic bag up to 1 week.

Corn

Do not husk or wash; store in plastic bag for 4 to 8 days. For best flavor, do not store; use immediately.

Cress, garden

Wash thoroughly in cold water; drain well. Store in plastic bag up to 1 week.

Cucumbers

Wash thoroughly in cold water and pat dry. Do not cut until ready to use. Store in plastic bag up to 1 week.

Dandelion

Cut off roots and remove any damaged leaves. Wash thoroughly in cold water; drain well. Store in plastic bag up to 1 week.

Eggplant

Store eggplant at about 50°F, up to 1 week. Do not refrigerate.

Endive

Wash thoroughly in cold water; drain well. Remove any damaged leaves. Store in plastic bag up to 1 week.

Fennel

Do not separate stalks or wash until ready to use. Store in plastic bag up to 1 week.

Horseradish

Cut off leaves and trim root; wash thoroughly in cold water and pat dry. Mix with vinegar and water according to recipe in "How to Freeze Vegetables." Store in airtight glass jar in refrigerator for 1 to 2 weeks. For stronger flavor, grate as soon as possible after picking; store in airtight glass jar.

Jerusalem artichokes

Wash tubers thoroughly in cold water and pat dry. Store in plastic bag for 7 to 10 days.

Kale

Wash thoroughly in cold water; drain well. Remove any damaged leaves. Store in plastic bag up to 1 week.

Kohlrabi

Cut off leaves and trim root; wash thoroughly in cold water and pat dry. Store in plastic bag up to 1 week.

Leeks

Cut off roots and all but 2 inches of leaves. Do not wash until ready to use. Store in plastic bag up to 1 week. Wash very thoroughly in cold water before using.

Lentils

Do not shell or wash until ready to use. Store in plastic bag up to 1 week.

Lettuce

Wash thoroughly in cold water; drain well. Store in plastic bag up to 2 weeks.

Mushrooms

Do not wash until ready to use. Store in open plastic bag or spread on a tray and cover with damp paper towels. Store up to 1 week. Wash quickly in cold water before using; pat dry.

Muskmelon

Do not wash. Store in plastic bag up to 1 week; cover cut surfaces with plastic wrap.

Mustard

Wash thoroughly in cold water; drain well. Remove any damaged leaves. Store in plastic bag up to 1 week.

Okra

Do not wash until ready to use. Store in plastic bag for 7 to 10 days.

Onions^ green

Wash thoroughly in cold water; drain well. Store in plastic bag up to 1 week. Do not refrigerate mature onions.

Parsnips

Cut off tops, leaving about 1 inch of stem. Do not wash until ready to use. Store in plastic bag for 1 to 3 weeks.

Peas, black-eyed

Do not shell or wash until ready to use. Store in plastic bag up to 1 week.

Peas, shelling

Do not shell or wash until ready to use. Store in plastic bag up to 1 week. For best flavor, do not store; use immediately.

Peppers

Do not wash until ready to use. Store in plastic bag up to 1 week.

Radishes

Cut off tops. Do not wash until ready to use. Store in plastic bag 1 to 2 weeks.

Rhubarb

Cut off leaves. Wash stalks thoroughly in cold water; drain well. Store in plastic bag up to 2 weeks.

Salsify

Cut off tops, leaving about 1 inch of stem. Do not wash roots until ready to use. Store in plastic bag for 1 to 3 weeks.

Shallots

Wash thoroughly in cold water; drain well. Store in plastic bag up to 1 week.

Sorrel

Wash thoroughly in cold water; drain well. Remove any damaged leaves. Store leaves or stalks in plastic bag fori to 2 weeks.

Soybeans

Do not shell or wash until ready to use. Store in plastic bag up to 1 week.

Spinach, New Zealand spinach

Trim roots and tough stalks. Wash very thoroughly in cold water; drain well. Store in plastic bag up to 1 week.

Sprouts (sprouted vegetable seed, any type)

Store in plastic bag up to 1 week. Use sprouts **as** soon as possible.

Squash, summer

Do not wash until ready to use. Store in plastic bag up to 1 week.

Tomatoes

Wash thoroughly in cold water; pat dry. Store uncovered up to 1 week, depending on ripeness. Let green tomatoes ripen at room temperature, out of direct sun or in cold storage; then store as above.

Turnips

Cut off tops, leaving about 1 inch of stem on roots. Do not wash roots until ready to use. Store in plastic * bag for 1 to 3 weeks. Wash greens thoroughly in cold water; drain well. Store in plastic bag for up to 1 week. Do not refrigerate turnip roots; keep in cold storage.

Watermelon

Wash thoroughly in cold water; pat dry. Store uncovered up to 1 week; cover cut surfaces with plastic wrap.

COLD STORAGE: KEEPING VEGETABLES FRESH ALL WINTER

Cold storage is an old-fashioned but time-tested method for keeping raw, whole vegetables through the winter. If you've planted a big vegetable garden and if you've got (or can construct) the storage space, storing can be the most practical way to go.

You'll find many vegetables from your garden well-suited to cold storage, including beets, carrots, onions, parsnips, potatoes, pumpkins, sweet potatoes, turnips, winter squash, and many others. For a complete list, see "Directions for storing vegetables," later in this chapter. Other vegetables should be used fresh or preserved. Vegetables that are not suitable for cold storage include asparagus, fresh shelling beans, green beans, chayote, corn, cucumbers, eggplant, fresh greens — beet greens, chard, cress, dandelion, endive, lettuce, mustard, and sorrel — fresh lentils, mushrooms, okra, green onions, fresh peas and chick peas, fresh peanuts, new potatoes, radishes, rhubarb, fresh soybeans, spinach and New Zealand spinach, summer squash, and ripe tomatoes. Shelled dried beans, lentils, peas and chick peas, soybeans, and dried peanuts can be kept up to one year in cold storage.

Late-ripening and maturing vegetables are the best choices for cold storage. Certain varieties take better to this method than others — late cabbage, for example. Check seed catalogs and packets before you buy and plant, and talk to the specialists at your County or State Extension Service Office. They can help you decide what vegetables to plant when you're planning your garden, and what storage methods work best in your area.

How cold storage works

Like any other method of food preservation, cold storage keeps food from decomposing by stopping or slowing down the activity of enzymes, bacteria, yeasts, and microbes that can eventually spoil food. In cold storage, this is done by keeping fresh, raw, whole vegetables at temperatures between 32°F and 40°F. In this range, the food won't freeze, but it stays cold enough to stop the spoilers. The length of storage time varies with each vegetable, from a few weeks for broccoli or cauliflower to four to six months for potatoes. Dried beans and peas will keep the longest — 10 to 12 months.

One of the advantages of storing your vegetables is that you don't risk eating unwholesome, spoiled food. If the food goes bad, you can tell almost immediately by the way it looks, smells, or feels. But there's still a lot to learn about storage. For example, squash have to be kept warmer than do carrots, so these two vegetables can't be stored In the same spot. Or, if you plan to keep cabbages or turnips, don't store them indoors in the basement; you'll soon find their strong, distinctive odor penetrating up into the house. And, if you live in a climate where heavy snow is common in winter, outdoor storage of vegetables in mounds or barrels isn't going to be practical for you, because deep snow will make them inaccessible In winter.

Although storing vegetables may sound easy, it's a lot more complex than at first meets the eye. Although you don't have to do any chopping, blanching, or processing of vegetables to be stored, each vegetable does have to be handled in a special manner. Perhaps the trickiest part of all is that you've got to keep a weather eye on your stored food. Since the temperature of cold storage depends on the temperature outdoors, you may sometimes have to move or change the location of stored vegetables, open windows or vents, or adjust the humidity level. When storing food indoors, keep a thermometer as well as a humidity gauge in the storage area so you can accurately monitor temperature and moisture conditions.

Because it's harder to control the temperature of stored food, spoilage can happen more easily than with any other form of food preservation. Routine checks for spoilage will help you prevent food losses when storing vegetables indoors — but, once you open up an outdoor mound or barrel, you'll have to empty it of all the stored vegetables at once.

Storage methods for vegetables

Before the days of refrigerators, freezers, and supermarkets, most families depended on cold storage to keep a supply of vegetables all year long. In colonial times, a certain portion of every harvest was kept in cool caves or in straw-lined pits that could withstand freezing temperatures. In later times, most houses were built to include root cellars or cold, damp basements intended as storage areas. These chilly spots were perfect for keeping root vegetables, celery, pumpkin, squash, potatoes, arid other vegetables through the cold months.

Compared to houses of a century ago, our modern dwellings are snug, warm, and dry. Today, very few homes offer the cool, damp basement corners, outdoor sheds, or attics that formerly served as food storage areas. That means you'll have to plan, and perhaps construct, one or more special spots for cold storage of your garden's bounty — particularly if you plan to store a variety of vegetables.

In milder climates, where frost is infrequent and doesn't penetrate too deeply, vegetables can be kept in specially prepared outdoor locations. In colder areas, you'll have to store the vegetables indoors as an extra precaution against freezing. In the directions for storing vegetables that follow, you'll find the proper storage method for each vegetable.

Four vegetable groups

Where and how you store each vegetable will depend on how much or how little cold it can take and the amount of humidity it needs to keep fresh. Vegetables to be stored fall into four groups: cold-moist, cool-moist, cold-dry, and cool-dry.

Vegetables that should be cold-moist stored make up the largest group, and include beets, broccoli, Brussels sprouts, cabbage, carrots, cauliflower, celery, turnips, and many others. These vegetables require the coldest storage temperatures — 32°F — and the highest humidity — 95 percent — of all vegetables that can be stored.

The second group of vegetables requires cool-moist: melons, peppers, potatoes, and green tomatoes. These vegetables can be kept at temperatures ranging from 38°F to 60°F and at humidity levels of 80 to 90 percent.

Dry onions and shallots require cold-dry storage temperatures of 32°F to 35°F and humidity of 60 to 75 percent.

The cool-dry group is composed of pumpkin and winter squash, dried peas and beans, and live seeds, all of which must be stored at temperatures of 50°F to 55°F and at a humidity of 60 to 70 percent.

Vegetables in the cold-moist and cool-moist groups can be stored outdoors in a mound or barrel, or indoors in a specially insulated basement storage room that is partitioned off from the central heating area or a root cellar. Vegetables in the cold-dry and cool-dry groups can be stored indoors in a cool area of a heated basement, but they must be kept away from water that might condense and drip down from overhead pipes. Cold-dry storage can also be provided by a dry shed or attic, window wells, or cellar stair storage.

The accompanying chart shows how vegetables in each of these four groups should be stored — at what temperature, at what humidity, and for how long. Any one of the storage methods discussed in this chapter can be used if it supplies the necessary conditions of temperature and humidity. For some vegetables in the cool-moist group, the refrigerator is an ideal storage area. And when cold storage doesn't add significantly to the length of time you can keep a vegetable from the cold-moist group, you may prefer just to refrigerate your crop, as detailed above.

Recommended storage conditions

Vegetable	Temperature	Humidity	Storage Period
Cold-moist group:			
Artichokes	32°-34°F	90-95%	1 month
Beets (roots only)	32°-34°F	90-95%	5-6 months
Broccoli	32°-34°F	90-95%	2-3 weeks
Brussels sprouts	32°-34°F	90-95%	1 month
Cabbage	32°-34°F	90-95%	3-4 months
Cardoon	32°-34°F	90-95%	2-3 months
Carrots	32°-34°F	90-95%	4-5 months
Cauliflower	32°-34°F	90-95%	2-3 weeks
Celeriac	32°-34°F	90-95%	2-3 months
Celery	32°-34°F	90-95%	2-3 months
Chicory			
roots and greens	32°-34°F	85-90%	2-3 months
roots only	32°-34°F	90-95%	10-12 months

Recommended storage conditions continued

Vegetable	Temperature	Humidity	Storage Period
Chinese cabbage	32°-34°F	90-95%	2-3 months
Collards	32°-34°F	90-95%	2-3 weeks
Fennel	32°-34°F	90-95%	2-3 months
Horseradish	32°-34°F	90-95%	10-12 months
Jerusalem artichokes	32°-34°F	90-95%	2-5 months
Kale	32°-34°F	90-95%	2-3 weeks
Kohlrabi	32°-34°F	90-95%	1-2 months
Leeks	32°-34°F	90-95%	2-3 months
Parsnips	32°-34°F	90-95%	2-6 months
Rutabagas	32°-34°F	90-95%	2-4 months
Salsify	32°-34°F	90-95%	2-4 months
Turnips			
roots	32°-34°F	90-95%	4-5 months
greens	32°-34°F	90-95%	2-3 weeks
Cool-moist group:			
Muskmelons	45°-50°F	85-90%	2-3 weeks
Peppers, sweet or hot	45°-50°F	85-95%	2-3 weeks
Potatoes	38°-40°F	85-90%	4-6 months
Sweet potatoes	55°-60°F	85-90%	4-6 months
Tomatoes, green	55°-60°F	85-90%	1 month
Watermelons	45°-55°F	80-85%	2-3 weeks
Cold-dry group:			
Onions (mature)	32°-34°F	60-75%	6-7 months
Seed, live	32°-40°F	65-70%	10-12 months
Shallots	32°-34°F	60-75%	2-8 months
Cool-dry group:			
Beans, dried (broad, dry, horticultural, or lima)	32°-50°F	65-70%	10-12 months
Chick peas, dried	32°-50°F	65-70%	10-12 months
Lentils, dried	32°-50°F	65-70%	10-12 months
Peas, dried (shelling, black-eyed)	32°-50°F	65-70%	10-12 months
Peanuts, dried	32°-50°F	65-70%	10-12 months
Pumpkins	50°-55°F	60-75%	3-6 months
Soybeans, dried	32°-50°F	65-70%	10-12 months
Squash, winter	50°-60°F	70-75%	5-6 months

OUTSIDE STORAGE

Where winters are mild and there isn't much snow, outside storage is an easy answer to holding large crops. You can store vegetables in well-insulated mounds or barrels, or in little underground lean-tos. Both cold-moist and cool-moist vegetables can be stored in these outdoor locations.

Mound storage

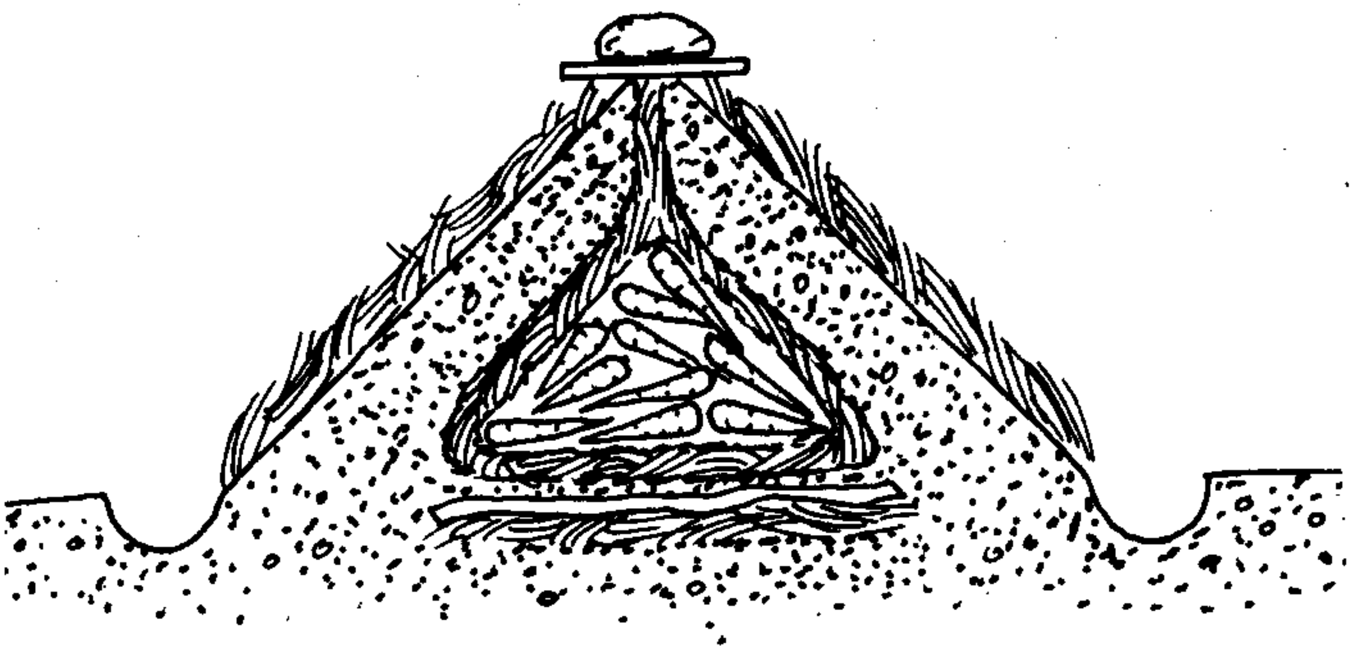
When planning mound storage, first find a spot in your garden where the mound will have good drainage. Dig a shallow, dish-shaped hole six to eight inches deep, and line it with straw or leaves. Spread the straw bed with some metal screening (to keep 6ut burrowing animals), and then stack your vegetables in a cone on the prepared bed. Wrap the individual pieces and separate the layers of food with packing material.

Making a cone or volcano shape, cover the mound with more straw or leaves, then shovel on three or four inches of dirt. Cover all but the top of the cone. Pack the dirt firmly with the back of your shovel. Pile on another thick (six- to eight-inch) layer of straw, but don't cover the top of the cone — it must be left open for ventilation. Put a piece of board on top of each mound to protect it from the weather. If necessary, weight the board with a stone or a brick to keep it in place. Finally, dig a shallow drainage ditch around the mound.

You can store several kinds of vegetables in the same mound, if they're separated by packing material — that way you can enjoy a bushel of mixed vegetables instead of all carrots or all potatoes. However, several small mounds are more practical than one large mound. Once you've opened a mound, it can't be repacked again—which means you'd have to take out all the vegetables at one time. With several smaller mounds, you can bring manageable portions of vegetables into the house, without having to disturb the whole store. The U.S. Department of Agriculture recommends changing the location of the pits every year to avoid contamination.

Cabbage mound storage

If you want to be able to remove cabbages a few at a time, you can store heads in a mound that's rectangular rather than volcano-shaped. Prepare a long, narrow, rectangular mound with the same base of straw or leaves, metal screening, and more straw, as directed for mound storage. Then put in the individual heads of cabbage head-down in one layer, more straw, and a final layer of dirt. Dig a small trench along each long side of the mound to drain off water. With this type of mound, you can remove just a few cabbages at a time, because there's only one layer of heads.



A storage mound in a garden provides safe keeping for your vegetables. A ground-level screen discourages burrowing animals; layers of straw and dirt topped by a board shelter the vegetables inside the cone-shaped mound.

Barrel storage

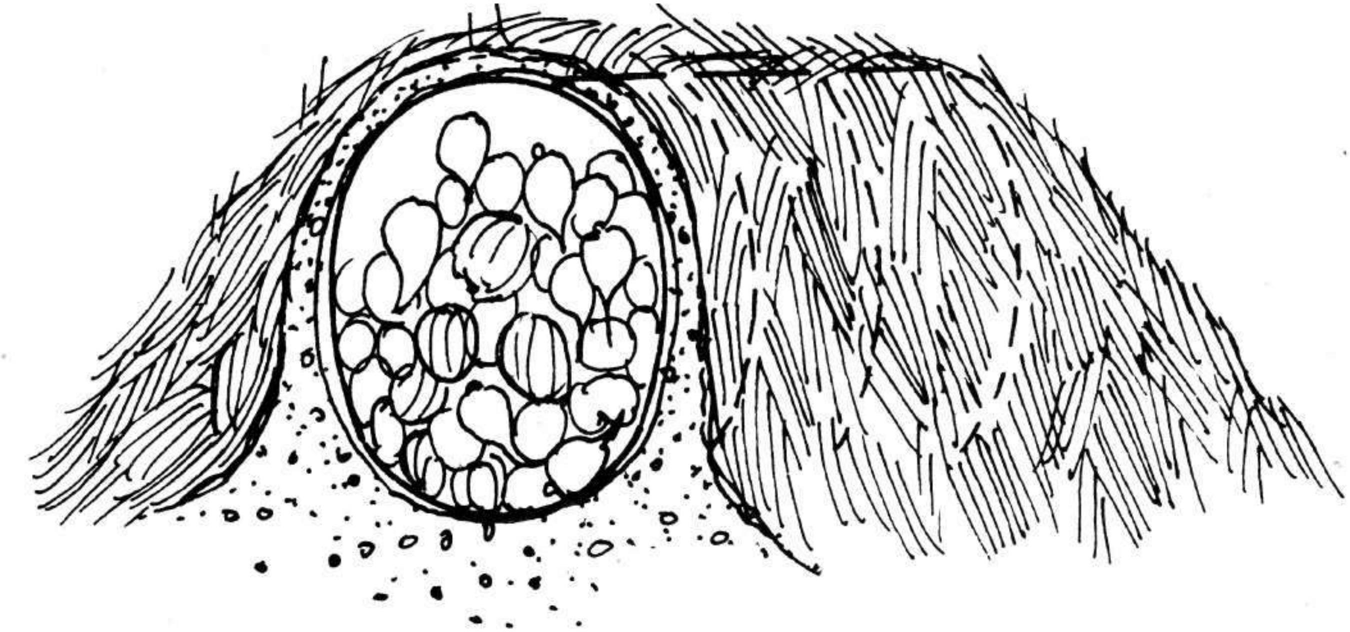
Choose a well-drained spot in your garden for barrel storage. Dig out a hole deep enough to cradle the barrel on its side — the barrel doesn't have to be completely buried. Line the hole with straw, and nest the barrel into it. Pack in the vegetables, cover the barrel opening with metal screening or tight-fitting wood covers to keep out rodents, then cover the whole barrel with several insulating layers of straw and dirt. Be sure to mark the location of the barrel mouth, so you can find it easily when you're ready to dig out the vegetables.

Frame storage

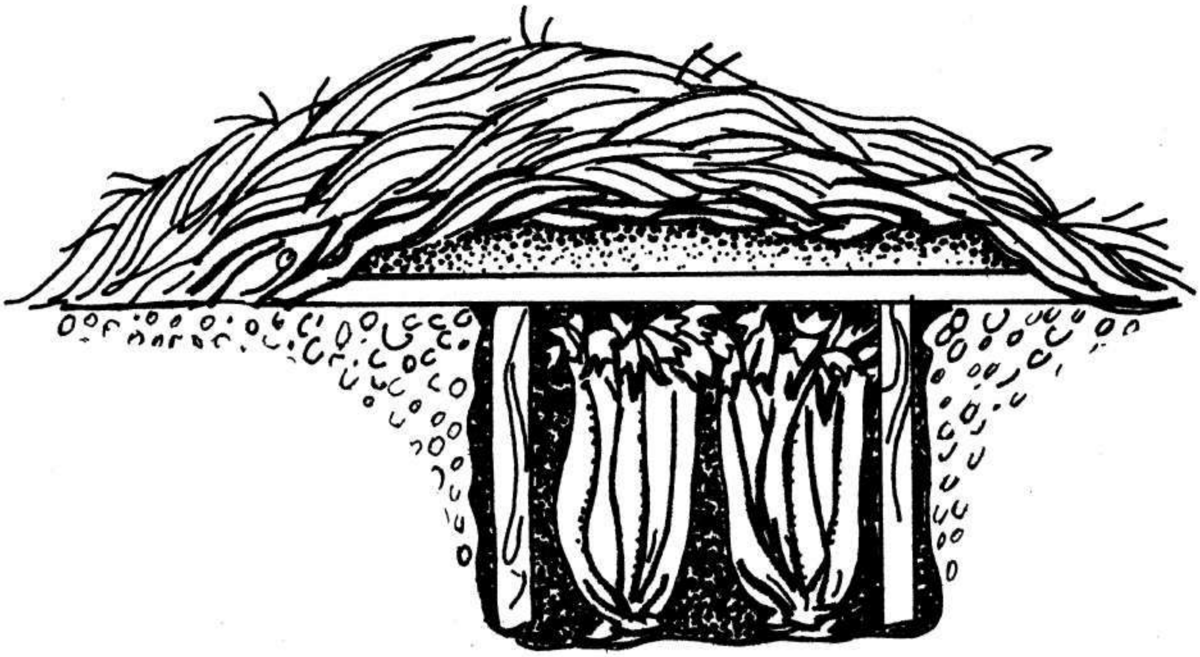
Frame storage is a special method that works best for celery and celerylike vegetables, such as Chinese cabbage and fennel. In this little underground lean-to, you store the celery bunches upright with their roots in the ground. Dig a trench about one foot deep, two feet wide, and as long as needed to hold the celery you've grown. Harvest the celery, leaving the roots intact, and stand the bunches up — closely together— in the trench. Water the roots, and leave the trench open until the celery tops are dry. Build a lean-to over the celery with the boards — set a wide board on edge along one side of the trenched celery, and prop another wide board against this support to make a slanted roof over the bunches of celery. Finally, cover the lean-to with straw and then with dirt.

INDOOR STORAGE — THE ROOT CELLAR

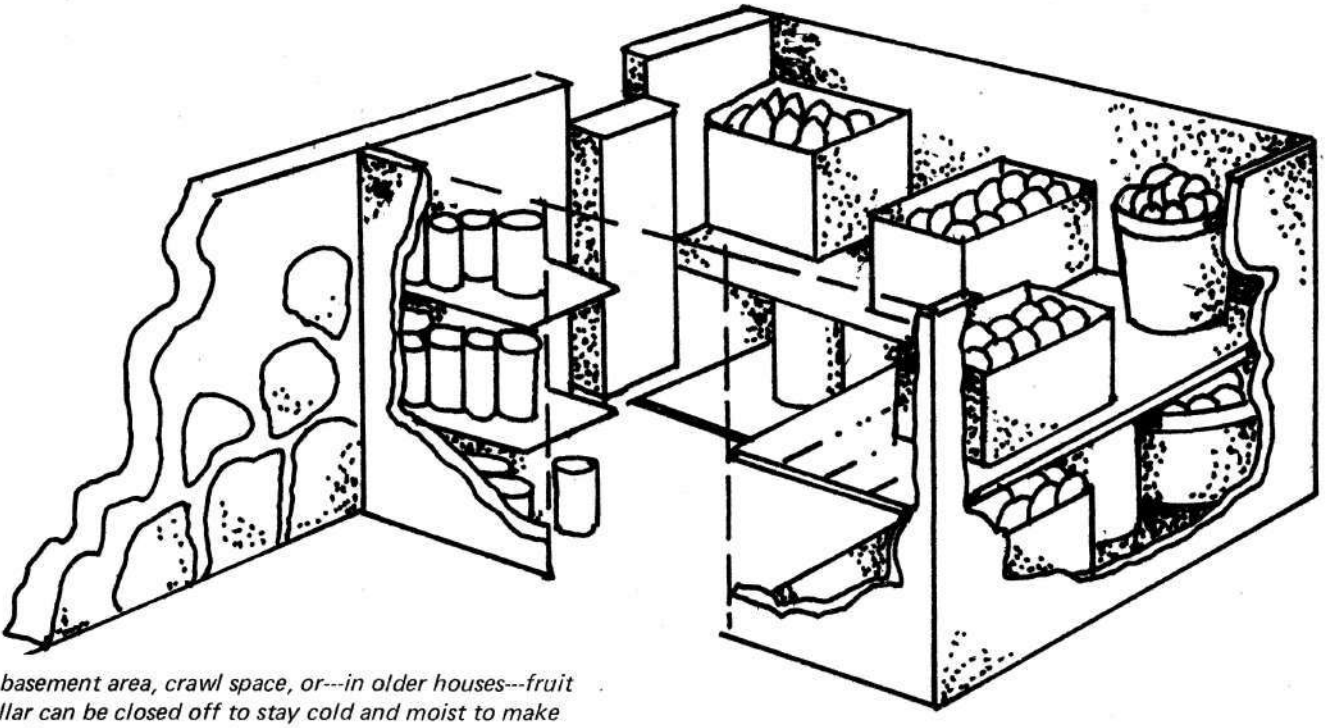
If you live in a region where freezing or very snowy weather is common in winter, you'll need to store your vegetables indoors. Your house (or possibly another building on your property) may offer several of the storage areas described in this section, or you may decide to build a basement cold storage room. If you live in an older house, there may be a fruit cellar or cold corner that could easily be closed off to stay cold and moist. Or, your newer house may have a crawl space that's cold and damp. However it's done, indoor storage calls for a bit more upkeep than outdoor storage, since you've got to keep an eye on the temperature, the ventilation, and the humidity to which your vegetables are exposed, as well as make routine checks for spoilage.



An alternative to the traditional mound method of storage is a barrel placed on its side and set in a well-drained outdoor location. Screens or wood over the opening keep out animal intruders; straw and dirt provide insulation.



Vegetables like celery, Chinese cabbage, or lettuce store well in frames. To make a frame, stand the vegetables in bundles in a trench about one foot deep. Cover them with a lean-to of boards and mound straw and dirt over the top.



A basement area, crawl space, or---in older houses---fruit cellar can be closed off to stay cold and moist to make an effective root cellar for your vegetables. Many vegetables can be stored all winter in a well-planned root cellar.

Check around your property to see if it offers storage areas like those described in this section. Test the temperature and humidity in any area you're considering *before* you use it for storing your vegetables. The ideal time to plan your storage area is in winter before you plant.

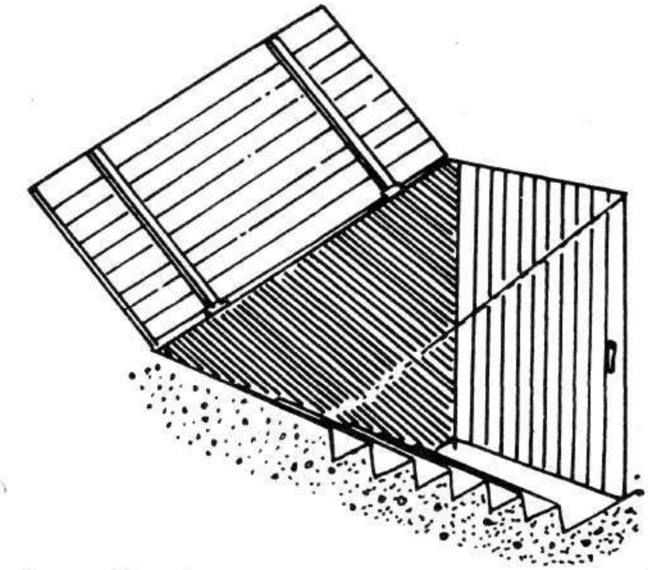
Temperature. You'll need to put up a reliable indoor/outdoor thermometer in your storage area. Most vegetables are stored at temperatures below 40°F but above freezing. However, there are some exceptions; watery vegetables such as tomatoes, green peppers, winter squash, and pumpkins, must all be cool-stored at temperatures above 40°F to keep from spoiling.

Humidity. Unless extra humidity is provided, your cold-moist and cool-moist stored vegetables will dry up and shrivel when stored indoors. Keep a humidity gauge in your storage area to be sure the vegetables are getting neither too much nor too little humidity, and make any necessary adjustments from time to time. You don't need fancy equipment or techniques for maintaining the right humidity. You might put pans of water or a tub of dampened sand on the floor; cover the floor with damp straw, sand, or sawdust; use damp sand or sawdust for packing the food; or line packing boxes with plastic bags.

Ventilation. You need ventilation in your storage area in case the indoor temperature grows too warm for the vegetables you're keeping. If that should happen, you must let in some cold winter air to cool things off. Good ventilation can be provided by a vent to the outside, a window, or a door. Although it's simple enough to open a window or a door to lower the temperature of your storage place, you must also protect your stored vegetables from contact with the air. Oxygen reacts with other substances in food to cause changes that will spoil the food. Since whole vegetables "breathe," they must be wrapped or packed in materials that will prevent oxidation. You must also keep the vegetables separate from one another so any spoilage won't be able to spread. To do this, layer the vegetables with clean, dry leaves, sand, moss, or dirt, or wrap each vegetable individually in paper.

Cellar steps storage

If your house has an outside basement entrance with stairs going down, you can use it as a storage area — the stairs become your shelves. You'll need a door at the top of the stairs, and probably another door at the bottom of the stairs, over the existing house door, to hold in the basement's heat. Which door you use as access depends on the climate. In a vegetables. In colder climates, you may need to go through the basement. Cover the outside door to keep your vegetables from freezing.

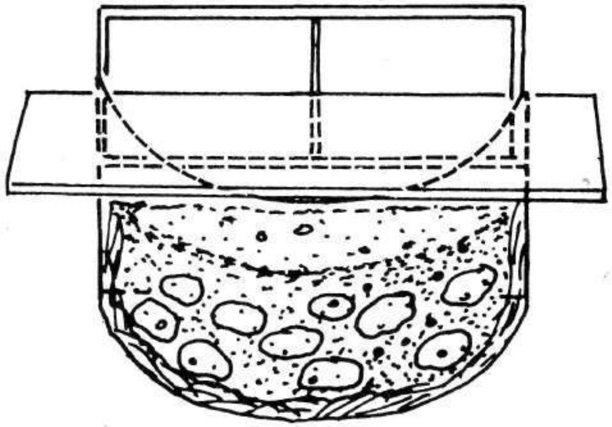


The outside stairs to your basement can make a good vegetable storage area. Set a plank on each step for insulation and check the temperature on each step.

Use a thermometer to check the temperature on each step and put barrels or boxes of food where the temperature is right for each item. It's a good idea to set a wooden plank as insulation on each step. If you need to add more humidity, set a bucket of damp sand on one of the steps.

Window well storage

Window wells can make nifty little storage areas, if they don't collect and hold water. Line the wells with



Line dry window wells with straw or bedding, put in the vegetables, then cover with a board or more bedding.

straw or bedding, put in the vegetables and add packing material, if necessary. Then cover the wells with boards or more bedding. If the windows open inward, you may be able to take vegetables out from the basement, without ever having to go outside and dig!

Dry shed or attic storage

Dry shed or attic storage provides cold, dry storage — just right for onions, shallots, pumpkins, and winter squash. By "dry shed," we mean any location that offers constant low temperatures and low humidity. This could be a garage, an unheated breezeway, a shed or storage building, even an unused doghouse, (if your garage or storage shed is fragrant with oil and gasoline, it's no good for storing vegetables. Some vegetables will absorb the oil and gasoline fumes and odors.) In milder winter zones, shelves in a storage shed or boxes on the floor may work well. If you live in a very cold region, you may have to insulate the corner of the shed to keep the vegetables from freezing.

Attic storage is convenient *only* if temperatures can be held somewhat constant. Since many attics will warm up quickly on a sunny day, you'll have to construct a special little storage area In it. Choose a spot that's well-insulated and near ventilation in the coldest part of the attic. Partition and roof it off from the rest of the attic, and use it for storing winter squash and onions.

Basement storage room

You can go all out and build a cold storage room in your basement. What you'll be doing is creating a separate little room, insulated from heat. You can get plans for constructing indoor cold storage rooms from agricultural extension offices, lumberyards, or gardening magazines.

Basically, you'll have to partition off an area that has no heating pipes or ducts. For ventilation, there should be a window — two or more windows if the room is partitioned. For air circulation, plan to have removable slatted flooring and shelves. Slatted flooring makes it easier to use dampened sawdust or other wet material to raise the humidity.

BASIC EQUIPMENT FOR STORING VEGETABLES

In addition to the proper indoor or outdoor storage areas, you'll need the following equipment to store your vegetables:

- Containers, such as wooden boxes, crates, barrels, or plastic garbage bags — cardboard boxes are only suitable for storing vegetables that need dry conditions.
- Newspapers or other paper for wrapping vegetables.
- Packing and insulating materials, such as sand, sawdust, peat, sphagnum moss, leaves, straw, or wood shavings.
- An indoor/outdoor thermometer for monitoring temperatures in an indoor storage area.
- A humidity gauge for monitoring the humidity in an indoor storage area.
- Metal screening for use as protection against contamination by rodents in outdoor storage areas.
- Wood slats for constructing lean-to and frames.
- A shovel for digging out mound, frame, or barrel storage areas.

BASIC COLD-STORING TECHNIQUES

Your vegetables must be harvested at just the right moment so they'll take well to storing and won't decay before you're ready to use them. Damaged or imperfect vegetables will spoil quickly, so you must be very careful when handling them prior to storing. Never store bruised or damaged vegetables; they can cause spoilage of your whole crop. It's usually better to clean off but not wash vegetables before storing, because washing can lead to the development of soft rot.

With methods of food preservation, you can process the food and then forget about it until you're ready to use it. Not so with storage. Since the temperature outdoors is the major factor affecting the. storage of your vegetables, you have to be constantly alert to the changes in weather. If it turns suddenly colder, warmer, or wetter, you must make whatever adjustments are needed to maintain the proper conditions in your storage area. You must also make regular spoilage checks of the boxes, bags, or bins of vegetables stored indoors.

Handling

Harvest vegetables as late as possible. For many vegetables, this means plant later than usual in order to get a late harvest. You should wait until the first frost warnings to harvest. Carrots, parsnips, potatoes, and turnips, for example, can stay in the ground even after the first frost or two, if the ground is well mulched.

Pick only perfect vegetables for cold storage and handle them carefully to avoid bruising. One bad item can spread decay to others and ruin the whole box, barrel, or mound.

Harvest on a dry day, if possible, and let the vegetables dry on the ground, in the sun, for several hours before packing them away. Onions often need several days of drying; potatoes, however, shouldn't be exposed to hot sun or strong wind. Produce should be cool when packed.

Wash vegetables, if you must, but most experts agree that all you really need to do is brush off excess dirt. The vegetables should be dry before you pack them.

Curing

Potatoes, pumpkins, and most types of winter squash have to be cured before storing. Curing is holding the vegetables at a warm temperature — 70°F to 85°F — in a dark, humid place for about 10 days. Curing hardens the skins and rinds and helps heal surface cuts, reducing mold and rot damage.

Packing

Some vegetables — potatoes, onions, and squash — can go from the garden right into boxes, barrels, plastic bags, or other containers. Root vegetables — such as beets, carrots, turnips, and parsnips — are better packed in some material such as newspaper that will insulate them, slow down their breathing, and keep them from touching one another, so decay can't spread from root to root.

You can wrap the vegetables separately in newspaper, then pack them loosely in boxes, barrels, or plastic bags. If you use plastic bags, poke a few holes in the bags to allow some ventilation. Other packing materials include damp or dry sand, sawdust, peat, sphagnum moss, leaves, straw, or wood shavings. Line the container with a layer of packing wood material, then arrange a layer of vegetables, leave space around each vegetable for packing material. Fill in around each vegetable and then again on top with a layer of packing material. Repeat these steps until the container is full. Be careful to leave enough room for examining the produce at the bottom of the container when you're making routine spoilage checks.

Moist sand is sometimes suggested for packing certain vegetables. You'll know the sand is just the right consistency if it feels cold and falls apart in your hand when squeezed, leaving just a few particles sticking to your skin.

DIRECTIONS FOR COLD-STORING VEGETABLES

If you plan to store a variety of vegetables, you'll probably have to arrange several different kinds of storage. The following directions for storing vegetables tell you which methods are best suited to each vegetable. Choose the one that works best for your climate and your available space.

Artichokes

Cut the fleshy, tight buds before they open. Artichokes are best stored in the refrigerator, but they can be kept in cold storage. Store on shelves or loosely packed in open boxes at 32°F to 34°F and 90 to 95 percent humidity (moist), with some air circulation. Store in a basement storage room or root cellar up to 1 month.

Beans, dried (broad, dry, or lima)

Dried beans won't freeze, and will store well when properly dried and packaged. Dry them according to the instructions in "How to Dry Vegetables." Then store them at 32°F to 50°F and 65 to 70 percent humidity (dry), with some air circulation. Store in a dry shed or attic for 10 to 12 months.

Beets

Choose late-maturing varieties and leave them in the ground until after the first few frosts. Dig them up when the soil is dry, and leave them on the ground for 3 or 4 hours. Remove the tops, leaving about 1/2 inch of the crowns. Don't remove the roots. Pack in packing material in wooden boxes, barrels, plastic bags with air holes, or in a mound or buried barrel. Store at 32°F to 34°F and 90 to 95 percent humidity (moist), with just a little air circulation. Beets will freeze at 30°F. Store in a basement storage room, root cellar, mound, or buried barrel for 5 to 6 months.

Broccoli

Harvest in late fall. Remove the root, but leave the leaves on as protection. Pack in boxes; separate and cover the stalks with moist sand. Store at 32°F to 34°F and 90 to 95 percent humidity (moist), with some air circulation. Broccoli will freeze at about 30°F. Store in a basement storage room or root cellar up to 3 weeks.

Brussels sprouts

Leave Brussels sprouts in the ground and mulch them heavily to protect the sprouts. Brussels sprouts plants can be stored in a frame, like celery, or in a mound, like cabbage, but often the size of the plants makes this impractical. Store Brussels sprouts

plants at 32°F to 34°F and 90 to 95 percent humidity (moist), with just a little air circulation. Store in a basement storage room or root cellar up to 1 month.

Cabbage

Choose late-maturing varieties. For storage in a root cellar, remove the roots, then cover the heads in moist dirt or sand in a bin. For outdoor mound storage, don't remove the stem or root. Place the cabbages head-down, pack straw between the heads, then cover with a final layer of dirt. Store at 32°F to 34°F and 90 to 95 percent humidity (moist), with just a little air circulation. Cabbage will freeze at 30°F. Store in a mound, buried barrel, or root cellar for 3 to 4 months. Do *not* store cabbages in a basement storage room; their strong odor can escape up into the house.

Cardoon

Harvest the plants with roots intact. Don't remove the tops. Set the roots firmly in moist sand or dirt so the plants stand upright, and construct a frame over the plants, as detailed earlier in this chapter. Keep the roots moist during storage, but don't water the leaves of the plants. Store at 32°F to 34°F and 90 to 95 percent humidity (moist), with just a little air circulation. Cardoon will freeze at just under 32°F. Store in a basement storage room, outside frame, or root cellar for 2 to 3 months.

Carrots

Choose late-maturing varieties, and leave them in the ground until after the first couple of frosts. After harvesting, leave them on the ground for 3 to 4 hours. Remove the tops, leaving about 1/2 inch of the crown. Don't remove the roots. Pack in packing material in wooden boxes, barrels, plastic bags with air holes, or bury in a mound. Store at 32°F to 34°F and 90 to 95 percent humidity (moist), with just a little air circulation. Carrots will freeze at about 30°F. Store in a basement storage room, mound, buried barrel, or root cellar 4 to 5 months.

Cauliflower

Harvest in late fall. Remove the root, but leave on the outer leaves as protection. Pack in boxes; separate and cover the heads with moist sand. Store at 32°F to 34°F and 90 to 95 percent humidity (moist), with a little air circulation. Cauliflower will freeze at about 30°F. Store in a basement storage room or root cellar for 2 to 3 weeks.

Celeriac

Dig up the roots when the soil is dry, and leave them on the ground for 3 or4 hours. Cut off the tops, leaving 2 or 3 inches of the crown; don't remove the root fibers. Pack in wooden boxes, barrels, or plastic bags with air holes, or in a mound or buried barrel. Store at 32°F to 34°F and 90 to 95 percent humidity (moist), with just a little air circulation. Celeriac will freeze at just under 32°F. Store in a basement storage room, buried barrel,mound,or root cellar for 2 to3 months.

Celery

Harvest the plants with roots intact. Don't remove the tops. Set the roots firmly in moist sand or dirt so the celery stands upright, and construct a frame over the plants, as detailed earlier in this chapter. Keep the roots moist during storage, but don't water the leaves of the plants. Store at 32°F to 34°F and 90 to 95 percent humidity (moist), with just a little air circulation. Celery will freeze at just under 32°F. Store in a basement storage room, outside frame, or root cellar for 2 to 3 months.

Chick peas^ dried

Dried chick peas won't freeze, and will store well when properly dried and packaged. Dry them according to the instructions in "How to Dry Vegetables." Then store them at 32°F to 50°F and 65 to 70 percent humidity (dry), with some air circulation. Store in a dry shed or attic for 10 to 12 months.

Chicory

Harvest the plants with the roots intact, and don't trim the leaves. Tie all the leaves together, then stand the plants upright in moist sand or dirt and construct a frame over the plants, as detailed earlier in this chapter. Store at 32°F to 34°F and 85 to 90 percent humidity (moderately moist), with just a little air circulation. Chicory will freeze at just under 32°F. Store in a basement storage room, outside frame, or root cellar for 2 to 3 months.

To store the roots only, dig them up when the soil is dry, and leave them on the ground for 3 to 4 hours. Remove the tops, leaving about 1/2 inch of the crowns. Pack in packing material in wooden boxes, barrels, plastic bags with air holes, or in a mound or buried barrel. Store at 32°F to 34°F and 90 to 95 percent humidity (moist), with just a little air circulation. Chicory roots freeze at about 30°F. Store in a basement storage room, mound, buried barrel, or root cellar for 10 to 12 months.

Chinese cabbage

Harvest the plant with roots intact. Don't remove the tops. Set the roots firmly in moist dirt so the cabbage stands upright and construct a frame over the plants, as detailed earlier in this chapter. Keep roots moist during storage but don't water the leaves of the plants. Store at 32°F to 34°F and 90 to 95 percent humidity (moist), with just a little air circulation. Chinese cabbage will freeze at just under 32°F. Store in a basement storage room, outside frame, or root cellar for 2 to 3 months.

Fennel

Harvest the plants with roots intact. Don't remove the tops. Set the roots firmly in moist sand or dirt so the plants stand upright, and construct a frame over the plants, as detailed earlier in this chapter. Keep the roots moist during storage, but don't water the leaves of the plants. Store at 32°F to 34°F and 90 to 95 percent humidity (moist), with just a little air circulation. Fennel will freeze at just under 32°F. Store in a basement storage room, outside frame, or root cellar for 2 to 3 months.

Horseradish

Choose late-maturing plants and leave them In the ground until after the first few frosts. Dig them up when the soil is dry, and leave them on the ground for 3 or4 hours. Remove tops, leaving about 1/2 inch of the crown. Don't remove the roots. Pack in packing material in wooden boxes, barrels, plastic bags with air holes, or in a mound or buried barrel. Store at 32°F to 34°F and 90 to 95 percent humidity (moist), with a little air circulation. Horseradish freezes at about 30°F. Store in a basement storage room, mound, buried barrel, or root cellar for 10 to 12 months.

Greens (collards kale and turnip)

Harvest the plant with roots intact. Don't remove the tops. Set the roots firmly in moist dirt so it stands upright. Keep the roots moist during storage, but don't water the leaves of the plant. Store at 32"F to 34°F and 90 to 95 percent humidity (moist), with some air circulation. Greens freeze at just below 32°F. Store in a frame for 2 to 3 weeks.

jerusalem artichokes

Dig the roots when the soil is dry, and leave them on the ground for 3 or 4 hours. Remove the tops, leaving about 1/2 inch of the crowns. Then pack into boxes or other well-ventilated containers, but without additional packing material. Store at 32°F to 34°F and 90 to 95 percent humidity (moist), with little air circulation. Jerusalem artichokes will freeze at just below 31°F. Store in a basement storage room or root cellar for 2 to 5 months.

Kohlrabi

Choose late-maturing varieties and leave in the ground until after the first few frosts. Dig when the soil is dry, and leave on the ground for 3 or 4 hours. Remove the tops, leaving about 1/2 inch of the crown. Don't remove the roots. Pack in packing material in wooden boxes, barrels, plastic bags with air holes, or in a mound or buried barrel. Store at 32°F to 34°F at 90 to 95 percent humidity (moist), with just a little air circulation. Kohlrabi freezes at 30°F. Store in a basement storage room, mound, buried barrel, or root cellar for 1 to 2 months.

Leeks

Harvest with roots intact. Don't remove the tops. Set the roots firmly in moist dirt so the leeks stand upright. Keep the roots moist during storage, but don't water the leaves of the plant. Store at 32°F to 34"F and 90 to 95 percent humidity (moist), with some air circulation. Leeks freeze at just below 32"F. Store in a basement storage room, outside frame, or root cellar for 2 to 3 months.

Lentils, dried

Dried lentils won't freeze and will store well when properly dried and packaged. Dry them according to the instructions in "How to Dry Vegetables." Then store them at 32°F to 50°F and 65 to 70 percent humidity (dry), with some air circulation. Store In a dry shed or attic for 10 to 12 months.

Muskmelon

Harvest melons slightly immature; they will continue to ripen during storage. Store at 45°F to 50°F and 85 to 90 percent humidity (moderately moist), with some air circulation. Pile or stack melons loosely, with no packing material, on shelves in a basement storage room or root cellar for 2 to 3 weeks.

Onions

Dig up mature onion bulbs and leave them on the ground to dry completely, usually about a week. Cut

off the tops, leaving 1/2 inch of stem. Pack the bulbs loosely, without any packing material, in well-ventilated containers. If you like, braid the tops together and hang the onions from hooks in a cold storage area. Store at 32°F to 34°F and 60 to 75 percent humidity (dry), with some air circulation. Onions freeze at just under 31°F. Store in a dry shed or attic for 6 to 7 months.

Parsnips

Choose late-maturing varieties and leave them in the ground until after the first few frosts. Dig them up when the soil is dry, and leave them on the ground for 3 or 4 hours. Remove the tops, leaving about 1/2 inch of the crown. Don't remove the roots. Pack in packing material in wooden boxes, barrels, plastic bags with air holes, or in a mound or buried barrel. Store at 32°F to 34°F and 90 to 95 percent humidity (moist), with a little air circulation. Parsnips freeze at 30°F. Store in a basement storage room, mound, buried barrel, or root cellar for 2 to 6 months.

Peanuts, dried

Dried peanuts won't freeze, and will store well for 10 to 12 months when properly dried and packaged. Dry them according to the instructions in "How to Dry Vegetables." Then store them at 32°F to 50°F and 65 to 70 percent humidity (dry), in a dry shed or attic.

Peas, **dried**
(shelling, black-eyed)

Dried peas won't freeze, and will store well when properly dried and packaged. Dry them according to the instructions in "How to Dry Vegetables." Then store them at 32°F to 50°F and 65 to 70 percent humidity (dry), with some air circulation. Store in a dry shed or attic for 10 to 12 months.

Peppers

Harvest before the first frost. Choose only the firmest peppers for storing, since they're easily damaged. Pack into plastic bags punched with air holes; then place in boxes. Peppers must be monitored very carefully during storage to be sure they don't become too moist or too cold. Store at 45°F to 50°F and 85 to 95 percent humidity (moderately moist), with a little air circulation. Peppers will freeze at just below 31°F. Store in a basement storage room or root cellar for 2 to 3 weeks.

Potatoes

Choose late-maturing varieties. Early potatoes are difficult to keep in cold storage. Dig the potatoes when the soil is dry, and leave them on the ground for 3 or 4 hours. Avoid sun and wind damage. Cure by storing them at regular basement temperatures — 60°F to 65°F—in moist air for 10 days. Then pack them into boxes or other well-ventilated containers, but without additional packing material. Store at 38°F to40°F, and 85 to 90 percent humidity (moderately moist), with a little air circulation. Potatoes will freeze at just below 31°F. Store in a basement storage room or root cellar for 4 to 6 months.

Pumpkins

Harvest just before the first frost, leaving an inch or so of stem. Cure at 80°F to 85°F for 10 days, or for 2 to 3 weeks at slightly lower temperatures. After curing, move them to a cooler spot for long-term storage. Store at 50°F to 55°F and 60 to 75 percent humidity (dry), with a little air circulation. Pumpkins will freeze at just above 30°F. Store on shelves in a basement storage room, dry shed, or attic for 3 to 6 months.

Rutabagas

Choose late-maturing varieties and leave them in the ground until after the first few frosts. Dig them up when the soil is dry, and leave them on the ground for 3 or 4 hours. Remove the tops, leaving about 1/2 inch of the crowns. Don't remove the roots. Pack in packing material in wooden boxes, barrels, or plastic bags with air holes, or in a mound or buried barrel. Store at 32°F to 34°F and 90 to 95 percent humidity (moist), with a little air circulation. Rutabagas will freeze at about 30°F. Store in a basement storage room, mound, buried barrel, or root cellar for 2 to 4 months.

Salsify

Harvest in late season. Dig them up when the soil is dry, and leave them on the ground for 3 or 4 hours. Remove the tops, leaving about 1/2 inch of the crowns. Don't remove the roots. Pack in packing material in wooden boxes, barrels, plastic bags with air holes, or in a mound or buried barrel. Store at 32°F to 34°F and 90 to 95 percent humidity (moist), with a little air circulation. Salsify freezes at about 30°F. Store in a basement storage room, mound, buried barrel, or root cellar for 2 to 4 months.

Seed^ live

Most gardeners buy seeds to plant, but you may want to harvest seeds to sprout when your vegetables mature. Cabbage and lettuce seeds, for instance, can both be sprouted, as detailed in "How to Sprout Vegetables." Leave the seeds on the plant until they're dry and fully mature; then harvest them. Store dried seeds in airtight plastic bags in a metal container, or in airtight glass jars; keep glass jars in a bag or wrap in newspaper to keep light from reaching the seeds. Store at 32°F to 40°F and 65 to 70 percent humidity (dry). Store in a dry shed or attic for 10 to 12 months.

Shallots

Dig up mature bulbs and leave them on the ground to dry completely, usually about a week. Cut off the tops, leaving about 1/2 inch of stem. Pack the bulbs loosely, without any packing materials, in well-ventilated containers. Store at 32°F to 34°F and 60 to 75 percent humidity (dry), with some air Circulation. Shallots freeze at just under 31°F. Store in a dry shed or attic for 2 to 8 months.

Soybeans^ dried

Dried soybeans won't freeze, and will store well when properly dried and packaged. Dry them according to the instructions in "How to Dry Vegetables." Then store them at 32°F to 50°F and 65 to 70 percent humidity (dry), with some air circulation. Store in a dry shed or attic for 10 to 12 months.

Squashy winter

Harvest just before the first frost, leaving on an inch or so of stem. Cure at 80°F to 85°F for 10 days, or for 2 to 3 weeks at slightly lower temperatures. After curing, store at 50°F to 60°F and 70 to 75 percent humidity (moderately dry), with some air circulation. Squash freezes at just above 30°F. Store in a basement storage room, root cellar, dry shed, or attic for 5 to 6 months.

Sweet potatoes

Choose late-maturing varieties. Put sweet potatoes directly into storage containers when you harvest them. Cure them under moist conditions at 80°F to 85°F for 10 days. At lower temperature, curing takes longer—2 to 3 weeks. Stack storage crates and cover them to hold in the humidity while curing. After curing, store at 55°F to 60°F and 85 to 90 percent humidity (moderately moist), with some air circulation. Sweet potatoes freeze at just below 30°F. Store in a basement storage room or dry shed for 4 to 6 months.

Tomatoes, green

Plant late so the vines will still be vigorous when you pick the tomatoes for storage. Harvest green tomatoes just before the first killing frost. When you harvest, remove the stems from the tomatoes, then wash and dry them before storing. Be careful not to break skins.

Separate the green tomatoes from those that are showing red. Pack green tomatoes 1 or 2 layers deep in boxes or trays; you can also ripen a few tomatoes for immediate use by keeping them in closed paper bags in the house and out of the direct sun. Store green tomatoes at 55°F to 60°F and 85 to 90 percent humidity (moderately moist), with good air circulation. At room temperature mature green tomatoes ripen in 2 weeks; at 55°F, ripening will be slowed down to nearly 1 month. Immature green tomatoes will take longer to ripen at either temperature; tomatoes showing some red will ripen faster, and can't be held in storage as long as totally green ones. Check your tomatoes once a week to monitor the ripening; remove the ripe ones and any that have begun to decay. Tomatoes will freeze at about 31°F. Store in a basement storage room or dry shed up to1 month.

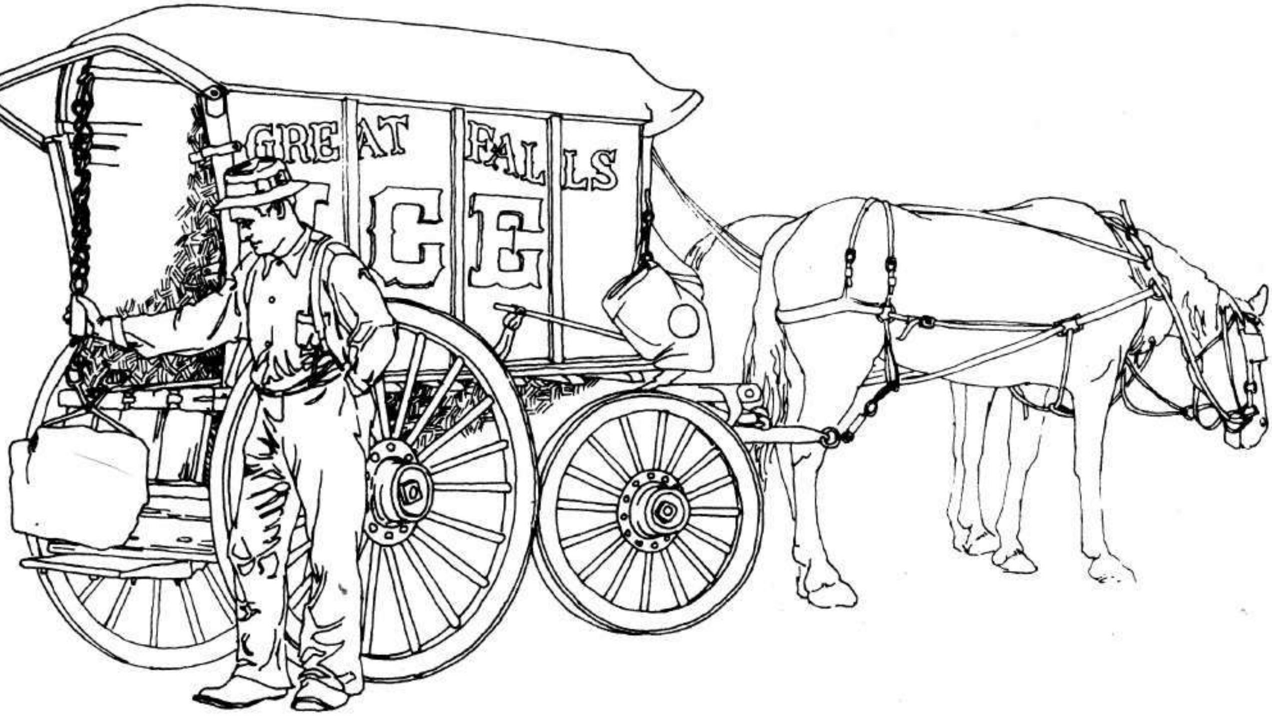
Turnips

Choose late-maturing varieties and leave them in the ground until after the first few frosts. Dig them up when the soil is dry, and leave them on the ground for 3 or 4 hours. Remove the tops, leaving about 1/2 inch of the crown. Don't remove the roots. Pack in packing material in wooden boxes, barrels, plastic bags with air holes, or in a mound or buried barrel. Since the strong odor of turnips can escape from the basement up into the house, it's wisest to store them separately and outdoors. Store at 32°F to 34°F and 90 to 95 percent humidity (moist), with a little air circulation. Turnips will freeze at about 30°F. Store in a mound or buried barrel for 4 to 5 months.

Watermelon

Harvest melons when fully ripe; they will not continue to ripen during storage. Store at 45°F to 50°F and 80 to 85 percent humidity (moderately moist), with some air circulation. Pile or stack melons loosely, with no packing material, on shelves in a basement storage room or root cellar for 2 to 3 weeks.

How to Freeze Vegetables



Freezing foods is one of the fastest and simplest methods of food preservation. It's easy to prepare food for the freezer and easy to prepare food for the table from the freezer. Best of all, foods preserved by freezing taste more like fresh than their canned or dried counterparts, and they retain more color and nutritive value.

Almost all vegetables take well to freezing. In fact, some vegetables shouldn't be preserved and stored by any other method. The list of better-frozen vegetables includes broccoli, Brussels sprouts, cabbage, cauliflower, eggplant, mushrooms, parsnips, edible-pod peas, pumpkins, rutabagas, and winter squash.

Although the techniques are simple and easy, freezing is a more expensive form of storage than canning. The freezer itself Is an investment, and it takes electricity to run. But if you manage your freezer wisely, it can still help you save on food costs.

Frozen vegetables can be stored a lot longer than many other foods, but shouldn't be kept stored for more than 12 months. By keeping your frozen foods in a constant state of turnover, the freezer space is being given maximum use. To get the most value from your freezer, use up the foods you've stored and replace them with others in season. The higher the rate of turnover, the lower the cost per pound of food.

Keep a list near the freezer to indicate what you've used, what's left, and what new foods you may be adding from time to time. By keeping track of what you have and how long it's been in the freezer, you'll be sure to use up all your frozen foods within the recommended storage period.

Getting started

Freezing is a simple method of food preservation and requires only a few steps. Having selected good-quaiity vegetables, then prepared and packaged them for freezing, you can sit back and let cold temperatures do the rest of the work.

Starting with the highest-quality vegetables and other foods is the single most Important factor In guaranteeing the quality of your frozen foods, but you must follow the directions for all freezing procedures exactly. Select the most perfect foods, and always exercise the strictest sanitary conditions and precautions when handling them. You can never be too careful about properly packaging and sealing foods for freezer storage.

If you follow freezing directions to the letter and keep food In a well-managed freezer, your frozen vegetables will be as delicious when you serve them as when you preserved them.

STOPPING THE SPOILERS

Extreme cold — and that means temperatures of 0°F or lower — is what stops the growth of the microorganisms In or around food that can cause spoilage. Zero temperatures also slow down enzyme activity and oxidation, which are chemical changes affecting the color, flavor, and texture of food. Although cold doesn't kill off these spoilers the way heating at high temperatures for canning does, freezing halts their activity during the time the food Is stored.

There are five major spoilers that can affect frozen food If it isn't handled properly:

- **Bacteria^ yeasts^ and molds** are normally present In all fresh foods. When these begin to multiply rapidly, spoilage occurs. You can stop these spoilers In their tracks by using the highest-quality vegetables and other foods, by preparing them under the most sanitary conditions, and by storing food at the specified, very cold temperatures.

- **Enzymes,** also normally present in all food, work to bring about chemical changes In it. These changes result in spoilage — unless enzyme activity is stopped before food is frozen, enzymes can destroy the fresh flavor of vegetables and cause them to take on an off-color. You can stop enzyme activity by blanching vegetables (a brief heat treatment) before freezing them.

- **Freezer burn** affects foods that haven't been wrapped carefully enough. If exposed surfaces on the food come in contact with the dry air of the freezer, moisture Is lost, and dry, tough surfaces develop. You can control freezer burn by using moisture vaporproof packaging materials that are airtight when sealed.

- **Large ice crystals** occur when food isn't frozen quickly enough. Quick-freezing means storing foods at O°F or even subzero temperatures. If foods freeze too slowly, moisture from the cells in the food fibers forms ice crystals between the fibers, and the product loses liquid and may darken. Quick-freezing at zero temperatures locks the cells in the food fiber in their proper places.

- **Oxidation** is a chemical change that occurs when frozen foods are exposed to oxygen. The oxygen reacts chemically with other substances In the foods to create changes that affect the quality of that food. To prevent loss of quality due to oxidation, fill and seal your freezer containers correctly and carefully.

BASIC FREEZING EQUIPMENT

Except for the freezer and proper packaging materials, your kitchen is probably already supplied with most of the other pots, pans, and utensils you'll need for home freezing. This section is a guide to the tools and materials necessary for proper freezing of vegetables. And always remember that — no matter how good your equipment — it must be spotlessly clean and sanitary while you work, to prevent bacterial contamination.

Freezer containers

Preserving food by freezing is based on the principle that extreme cold (0°F) halts the activity of microorganisms, enzymes, oxidation, and other changes that cause food spoilage. When preserving foods by the heat treatment method of canning, containers must be hermetically sealed. Although that's not necessary for frozen storage, the packages you use *must* be airtight, as well as moisture/vaporproof, odorless, tasteless, and greaseproof.

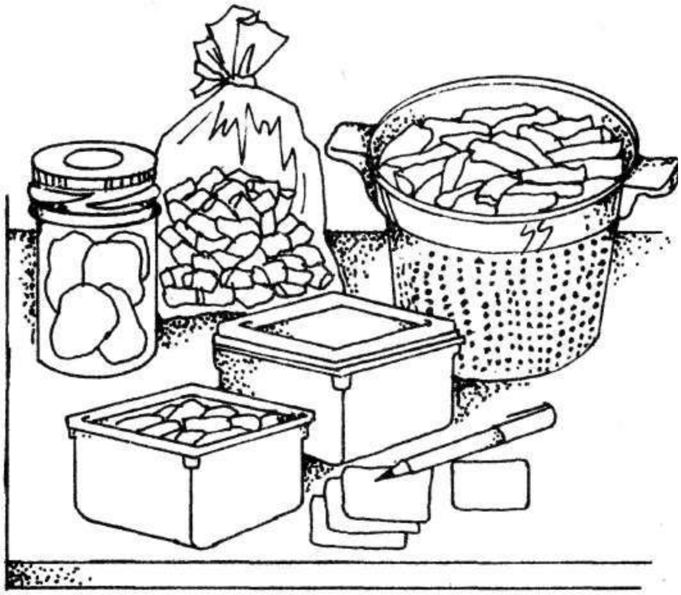
The best package size for you depends on your freezer and your family. Pack food in containers that will take care of your crew for one meal. You can plan on two servings to a pint container; three or four servings from a quart-size. It's quicker to thaw two single pint containers than one large container.

There are two kinds of freezer containers suitable for freezing foods at home — rigid containers and flexible bags or wrappers. Some delicate vegetables like asparagus or broccoli might be damaged if packaged immediately after blanching. To protect them, these vegetables are tray frozen briefly before being packed in freezer containers.

Rigid containers. Rigid containers are best for vegetables or foods that are liquid or don't have a distinct shape. Rigid containers include plastic freezer containers with tight-fitting lids or can-or-freeze jars with wide mouths and tight-fitting lids. Square or rectangular containers use freezer space more efficiently than round containers or those with flared sides or raised bottoms. Freezer containers can be reused. Wash them and their lids in hot suds; then rinse, drain, and cool.

Can-or-freeze jars come in three sizes: 1/2 pint, 1 pint, and 11/2 pints. Plastic freezer boxes come in 1-pint, 11/2-pint, 1-quart, and 2-quart sizes.

Freezer bags and pouches. Bags made from polyethylene or heavy-duty plastic or the new boilable pouches that can be heat-sealed are also good for freezing vegetables. Liquid foods are safest in plastic



Rigid containers and plastic freezer bags are both suitable for home freezing; or, if you prefer, use glass can-or-freeze jars. You will also need a blancher, labels, and a freezer marker.

bags that are then placed in protective cardboard boxes. Although bags aren't always easy to stack, they're great for tray-frozen vegetables and bulky or odd-shaped items.

Plastic freezer bags come in many sizes: 1 pint, 11/2 pints, 1 quart, 2 quarts, 1 gallon, and 2 gallons you close these bags by pressing out the air, twisting the top and doubling it over, then wrapping the top several times with a twist tie.

Other packaging materials. Never use empty, plastic-coated milk cartons or cottage cheese or ice cream containers for freezing, since these aren't airtight enough to be reused as freezer containers. Lightweight plastic wrap, butcher paper, and waxed paper aren't tough enough to protect food in the freezer, either. Freezer wrap — specially laminated or coated freezer paper, heavy-duty plastic wrap, or heavy-duty aluminum foil — is seldom used for freezing vegetables. Reserve it for meats, fish, game, casseroles, and cakes.

The freezer

In this book, all references to a freezer mean a separate appliance for freezing only. The ice-cube

section of a refrigerator is good for very short-term storage only, and "short-term" means days, not weeks or months. The separate freezing compartment of a refrigerator can hold food for weeks; a side-by-side freezer section can hold food for a few months. But, for long-term storage at 0°F, a separate household freezer is still your best bet.

Three types of freezers. There are three types of home freezers from which to choose. *Upright freezers* range in size from 6 to 22 cubic feet and may have 3 to 7 shelves. *Chest freezers* run from 6 to 32 cubic feet. *Refrigerator-freezer combinations* range in size from 2 to 16 cubic feet of freezer space. Freezers with the frostless feature save you the work of annual defrosting, and keep frost from building up on food packages. (Frostless freezers should be cleaned annually.)

The freezer size and type you buy will depend on your needs and available space. A chest freezer usually costs less to buy, and to run, but an upright may fit into your home more easily. Most folks agree that it's easier to find and remove foods from an upright freezer, too. In a combination model, the freezer is separated from the refrigerator section, having a separate door, either at the top, bottom, or side of the refrigerator. Check your space and your budget to decide which type is best for you.

Plan on 6 cubic feet of freezer space per person in your family. Then, if you can manage it, buy a freezer bigger than that. Once you get used to having a freezer, you'll have no trouble filling it.

Whichever freezer type you choose, place it in a cool, dry, and well-ventilated location. Before you start shopping, scout out a good location in your home, measure it, and check your doorway measurements to be sure the freezer you buy will fit through them.

Adjusting freezer temperature. Keep track of your freezer's temperature with a refrigerator-freezer thermometer. Put it toward the front of the storage area, fairly high up in the load of food. Leave it overnight — without opening the freezer — before you check it for the first time. If the thermometer reads above 0°F, adjust the freezer's temperature control to a lower setting. Wait another day and check the thermometer again to see if you adjusted the temperature correctly. When you've got the temperature just right, check the thermometer once a day. But, if your freezer has an automatic defrost, don't take a reading during the defrost cycle — it won't be an accurate reflection of normal freezer temperature.

Managing your freezer. For the most efficient use of your freezer, you must be organized. Think of your freezer as a warehouse or a food depository. You need to keep track of what's inside, when it went in, and when it should come out. "First in, first out" is the byword for the best in flavor and appearance in frozen food. The food is still safe to eat after 12 months, but may not be at the peak of its quality. As a rule of thumb, rotate your entire stock about every six months, or freeze only enough vegetables to last until the next growing season.

By grouping like **with** like in your freezer, your inventory will be more organized and your searching simplified. One shelf or section can keep vegetables, another fruits, another cooked foods or main dishes. Devise an inventory form to help you keep track of where each category of food is. You might put the chart on a clipboard hung on the freezer door handle or nearby. Then note what goes in, out, how much, and when. Don't forget to label each and every package clearly — in writing or symbols someone besides yourself can read! Legible labels and good packing in the freezer make inventory and food selection easy.

As you use your frozen food, keep a running check on your methods and packaging. If you notice that a particular bag, container, or sealing method isn't doing the job, make a mental note of it and try another procedure or packaging next time.

Caring for your freezer. Take care of your freezer according to the manufacturer's directions. By keeping the freezer defrosted, free of ice, and clean, it'll work better and cost you less to operate. A full or almost-full freezer is cheaper to run than an empty or almost-empty one. The higher the turnover — the more you use and replace frozen foods — the less your freezer "warehouse" costs per item.

If your freezer needs an annual or semi-annual defrost, do it while the weather is cold, preferably before you start planning your garden. During a defrosting in cold weather, not only can the food wait outside (in well-insulated boxes or coolers), but you can take a thorough inventory and then determine how much to plant in spring. If you have lots of green beans left in March, that's a clue that supply is exceeding demand. Put up less the coming year and fill that freezer space with something else.

To defrost your freezer, follow manufacturer's directions. If you don't have directions, remove food to a cold place — outdoors in a cooler, if the Weather is very cold or placed in a neighbor's freezer, or a locker. Unplug or turn off the freezer, and put in a pan or two of hot water or a blowing fan to help hurry the melting. DON'T use a hair dryer or other heating appliance, because the heat could melt or warp some of the materials on the inside of the

freezer. As the ice loosens, scrape it off with a plastic windshield scraper or other similar tool. When all the ice is gone, wash the inside of the freezer with a solution of three tablespoons baking soda dissolved in a quart of warm water. Wipe dry, turn the freezer on, and put the food back in. Clean frostless freezers with a baking soda solution annually.

If your freezer develops an odor, put a piece or two of charcoal on a paper towel and set them in the freezer a few days.

What to do when the freezer goes out. if your freezer quits or the power goes out, there are several steps you can take to protect your frozen foods. First, set the freezer temperature at the lowest setting, then shut the freezer and DON'T OPEN IT UNLESS ABSOLUTELY NECESSARY. If kept closed, a full freezer will keep food frozen for 15 to 20 hours and food will stay below40°F for up to 48 hours. A half-full freezer may keep foods frozen for just under a day.

If the freezer will be off for longer, dry ice could save the day, if you act quickly. (It's a good idea to locate a source of dry ice in advance and keep the name and number handy for just such an emergency.) A 25-pound chunk of dry ice, carefully handled with gloves and placed on a piece of heavy cardboard on top of the packages of food, should hold a half-full freezer (10 cubic feet) for two to three days; if the freezer is full, it will carry you over for three to four days. (Use two-and-a-half pounds of dry ice for each cubic foot.) Be sure the room is well-ventilated when you're working with dry ice.

If dry ice is unavailable, pack up the food and use a locker or a neighbor's freezer.

If the food's temperature rises above 40°F — ordinary refrigerator temperature — check it over carefully and immediately cook it completely. It's always better to use thawed foods immediately. If you do refreeze thawed foods, use them as soon as possible. If the food shows any signs of spoilage — color or texture change, slipperiness, or off-odor — and has been over 40°F, don't take any chances — toss it out. A freezer thermometer is an excellent guide to freezer safety. If you don't have a thermometer, feel the food and take a guess. Anything that's still frozen solid, and still has ice crystals throughout, is safe to refreeze or use if you're quick about it.

The blancher

Vegetables are precooked slightly before freezing in order to arrest the chemical changes that are caused by enzyme activity. This brief heat treatment is called blanching, and you'll need a blancher to do it properly. A blancher is a large pot, with a cover and a perforated insert or basket insert for lifting vegetables out of the boiling water. You can buy one in the housewares section of most stores, or you can make your own from a large (6- to8-quart) pot with a cover and something (a colander, sieve, deep frying basket, or cheesecloth bag) to lift the vegetables from the boiling water.

When you aren't using the blancher for freezing vegetables, it won't gather dust. It can also be used as a spaghetti cooker, steamer, or even a deep-fat fryer.

Other basic equipment

Besides the freezer and blancher, the basic equipment for freezing consists of whatever kitchen implements you'll need to prepare the food for packaging. Remember that it's essential to keep equipment, work area, and hands clean.

To freeze vegetables successfully, you'll need:

- Rigid freezer containers with airtight lids for liquid foods: plastic freezer containers; freezer cans or jars with wide mouths
- Bags: plastic storage bags; heavy-duty plastic bags; or boilable pouches
- String, rubber bands, pipe cleaners, or twist ties to fasten freezer bags
- Shallow tray, cookie sheet, or jelly-roll pan for tray freezing
- Additional heavy-duty plastic wrap or heavy-duty aluminum foil
- Sharp paring knife
- Chopping knife
- Colander, sieve, strainer, or paper towels
- Stiff vegetable scrubbing brush
- Teakettle for extra boiling water
- Ricer, food mill, or blender for mashing or pureeing
- Freezer tape to seal wrapped foods and to make labels
- Grease pencil or felt-tip marker or pressure-sensitive labels for labeling packages

BASIC INGREDIENTS

Choose vegetables that are tender, ripe but just barely ready to eat, and just as fresh as possible. Slightly under-mature vegetables are better for freezing than those that are past their prime. For peak flavor, rush vegetables from the garden to the freezer within two hours. If you can't freeze vegetables within that time limit, cool the vegetables quickly in ice water, drain well, and keep

refrigerated until ready to prepare for freezing.

Ice. Since cooling is an important part of preparing vegetables for freezing, you need plenty of Ice at hand to keep the cooling water really cold. Estimate one pound of ice for each pound of vegetables you're going to freeze. Keep a good store of ice in reserve for your home freezing heeds by filling heavy-duty plastic bags with ice cubes, or freezing water in empty milk cartons. Keep adding to your stored ice from time to time, and you won't be caught short in the midst of a big freezing job.

Butter and seasonings. Most vegetables are frozen without any flavoring or seasoning added. However, if you want to freeze pouched vegetables in butter sauce, we suggest a combination of butter, salt, and herbs (oregano, basil, savory, chervil, tarragon, thyme, sage, or marjoram).

BASIC FREEZING TECHNIQUES

Although freezing food is one of the easiest methods for putting food by, that doesn't mean there's nothing to it. If you approach the project carefully and scientifically, you'll be able to get the best frozen food possible and to use energy wisely.

Most vegetables take well to freezing, and, when you serve them at a later date, they'll be as close to fresh as any preserving method can guarantee. In fact, some vegetables shouldn't really be stored by any other method, since freezing has proven to be the best method for preserving them. These include broccoli, Brussels sprouts, cabbage, cauliflower, , eggplant, mushrooms, parsnips, edible-pod peas, pumpkins, rutabagas, and winter squash. The only vegetables that don't freeze well are lettuce and other fresh greens for salads, and watery vegetables like radishes and cucumbers.

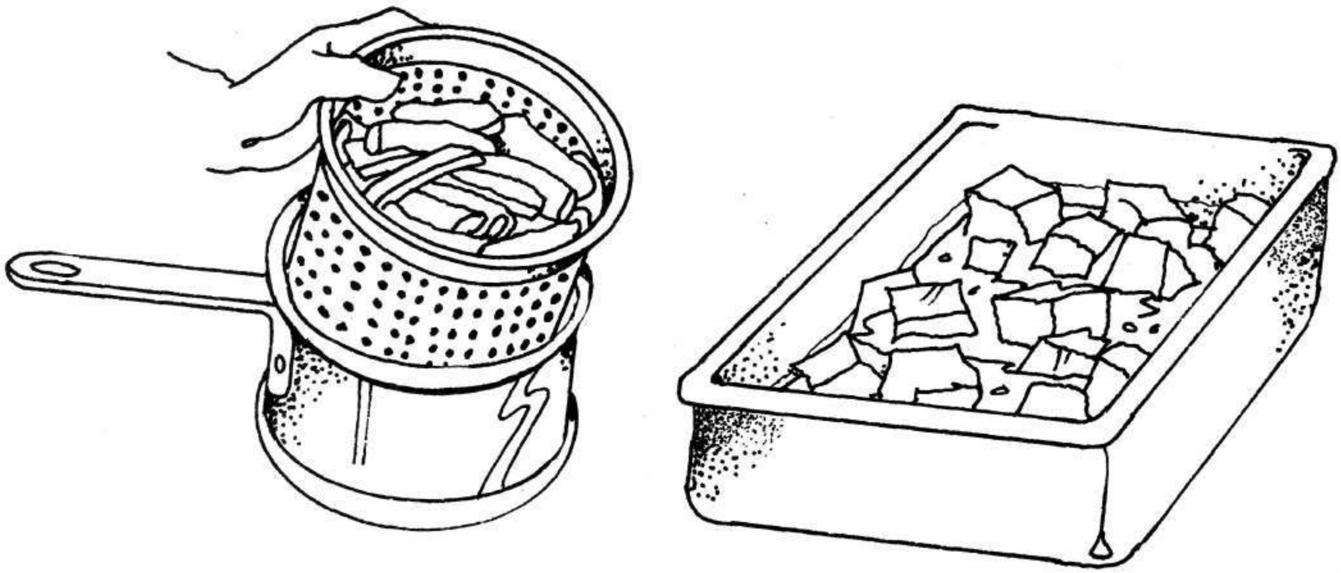
Other than those, almost anything can be frozen. When you aren't sure whether you'll like a certain vegetable frozen, try a sample batch of just a few packages, bags, or containers. Freeze for a couple o1 weeks, then taste. If you hate it, not much has been lost.

It's a good idea to check with your local Cooperative Extension Service Office for advice on the best vegetables to plant for freezing. Knowledgeable produce people, either in the supermarket or at a stand, can be excellent sources of information, too.

Selecting the vegetables

Rule number one is to select the highest-quality food possible. The vegetables you choose should be tender, fresh, and ripe enough to be eaten right away. NEVER use vegetables that have become overripe either before or after harvesting.

As with any preserving method, you must clean



Vegetables should be blanched before freezing to arrest enzyme action. To blanch properly, use a blancher with a perforated insert; blanch for the time recommended in each recipe. Transfer blanched vegetables quickly to a large pan of ice water to stop the cooking process.

vegetables carefully before freezing. Wash, scrub, rinse, and drain them just as if you were going to eat and serve them right away.

Blanching

Blanching is a brief heat treatment given to vegetables before they're packaged and frozen. Its purpose is to stop the action of enzymes, which can destroy the fresh flavor of vegetables and cause off-colors. If you want to successfully freeze vegetables, it's generally necessary to blanch them before freezing. This simple technique also helps seal in vitamins, brightens the color of vegetables to be frozen, and shrinks them slightly to make packing easier. When freezing herbs or vegetables such as green onions or hot peppers, which are to be used for flavoring only, blanching *isn't* necessary.

Follow blanching times given in the freezing recipes precisely. Blanching for too short a time is worse than not blanching at all — enzyme action will be stimulated instead of stopped. And, if blanched for too long a time, your vegetables will cook, losing vitamins, minerals, flavor, and color.

Use one gallon of water per pound of vegetables, or two gallons for leafy greens. Blanching water must be boiling when you lower the vegetables into it. Fill the blancher with vegetables and lower it into boiling water; start timing as soon as the vegetables have gone into the boiling water. You may keep the blancher covered during the blanching period or keep the heat on high and stir frequently. If you live at 5,000 feet or more above sea level, blanch one minute longer than the times specified in each recipe. You can also blanch vegetables in a microwave oven. Follow the directions in the manufacturer's instruction book.

When blanching a large quantity of vegetables, start with only the amount that can be blanched and cooled in a 15-minute period, and put the rest in the refrigerator. Package, label, and freeze each blanched group before starting on the next. You can use the same blanching water for several batches of vegetables, adding additional boiling water from a teakettle to replace water lost through evaporation. If you wish, change the water when it becomes cloudy. Keep a second pot or large teakettle boiling, so you won't be delayed when the time comes to change the blanching water.

Cooling

After vegetables have been precooked the exact amount of time, remove them immediately from the boiling water and cool them. This is crucial for keeping the heating process from continuing past the proper period for each vegetable or food. Transfer the vegetables quickly from the blancher to the ice water. The kitchen sink is a good spot for holding ice water to cool vegetables, but if you want it free for other uses, put the ice water in a plastic dishpan or other large, clean container.

Be sure to add new ice to the Ice water frequently, so it stays as cold as possible. You'll need plenty of ice on hand to keep the cooling water really cold. Plan on one pound of ice for every pound of vegetables you're going to freeze. To have a ready supply when you need it, you'll have to stock up in advance.

Packing and sealing

The secret to successful freezer packaging is to seal the air out and keep it out. Immediately after blanching and cooling, pack vegetables loosely in proper containers. Plastic freezer bags and boxes or can-and-freeze jars are all excellent. Freezer containers must be airtight, moisture/vaporproof, odorless, tasteless, and greaseproof.

Head space. Since food expands as it freezes, you must allow room — or head space — for this expansion. Otherwise the lids will pop off, bags will burst, and you'll have wasted food, time, and money. Foods that are dry need no head space. Food that's packed in liquid or is mostly liquid needs 1/4 inch of head space for pints, 1/2 inch for quarts. If you pack foods in containers with narrow mouths, the food expands upward in the container even more, requiring^ inch of head space for pints and iy2 inches for quarts. We suggest you stick to wide-mouth containers. The recipes in this book give you head space needs for each particular food for wide-mouth containers only.

Sealing. How you seal food for the freezer is just as important as how you package it. After wiping the mouths of your freezer containers with a clean, damp cloth, seal rigid containers by following the manufacturer's instructions (if there are any), or by snapping, screwing, or fitting the lid tightly on the container. If the lid doesn't seem tight, seal it with freezer tape.

Seal bags or boilable pouches with a heat-sealing appliance; follow the instructions that come with the heat sealer. Or seal bags by pressing out the air, then twisting the bag close to the food. Fold the twisted section over and fasten it with a rubber band, pipe cleaner, or twist tie. To get air out of an odd-shaped bag, lower the filled bag into a sink full of water and let the water press the air out. Twist the bag top, lift it out, double the twisted area backward, and fasten.

Labeling. A good freezer label should tell what food is in the package, the amount of food or number of servings, and when it went into the freezer. Better yet, it should tell how the food was packed, and when, for example, "Sugar Pack Strawberries — June, 1976." You might want to include an "expiration" or "use-by" date. Frozen main dishes, sauces packed in boilable pouches, and other more complex items call for a label with description, number of servings, perhaps even heating and thawing instructions.

Select labeling materials that will last. A grease pencil or felt tip marker may write directly on the container. Freezer tape makes a quick label, as do pressure-sensitive labels from a stationery store. Try to print legibly and use standard abbreviations.

Tray freezing. This technique is used with more delicate vegetables — asparagus for example — to keep them from being damaged during packaging. Since individual stalks are frozen separately first, tray freezing allows you to remove serving portions from the pouch when you need them. To tray freeze, blanch the vegetables, cool them in ice water, drain well, and then spread in a single layer on a cookie sheet, jelly-roll pan, or special tray. Freeze until just solid — usually about an hour. As soon as the vegetables are frozen solid, transfer them to containers, bags, or pouches. Seal the containers and store them in the freezer.

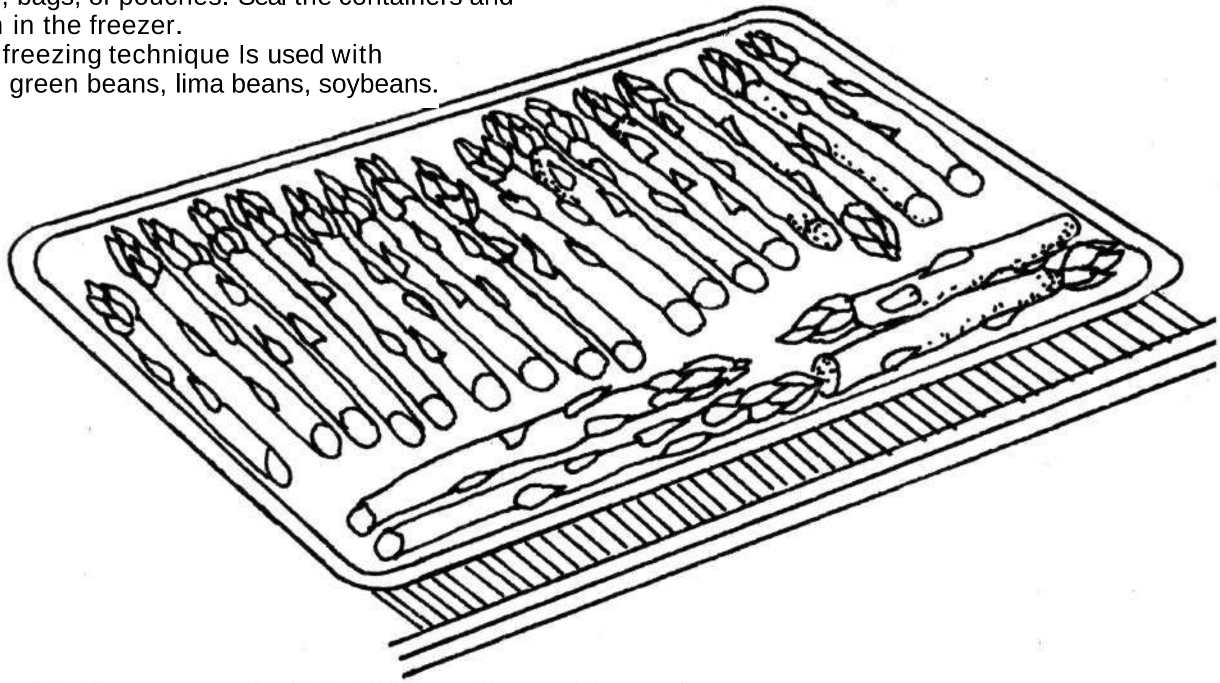
The tray freezing technique Is used with asparagus, green beans, lima beans, soybeans, broccoli, Brussels sprouts, cauliflower, whole- * kernel corn, kohlrabi, peas, sweet or hot peppers, prepared potatoes, rutabagas, and summer squash. The recipes that follow indicate if tray freezing is recommended.

Quick-freezing

Put your sealed freezer packages in the coldest spot in your freezer, which should be set at 0°F. Place the containers in a single layer, leaving a little space between each package for heat to escape — or follow any specific freezing directions given by the manufacturer. Be sure to set the freezer temperature control to the lowest setting several hours *before* you'll be preparing food for freezing.

Look back to the use-and-care book that came with your freezer to locate the coldest sections. If you have an upright freezer, the shelves are the coldest places; in a chest freezer, the coldest places are near the walls. In a combination refrigerator-freezer, the shelves inside the freezer—not the door shelves — are the coldest places.

After arranging packages in a single layer, shut the freezer and leave it alone for 24 hours. When that time has elapsed, the food should be frozen solid. Stack it up and move it away from the coldest part to



Delicate vegetables like asparagus should be briefly tray frozen before they're packaged. Spread the blanched vegetables in a single layer on a cookie sheet or tray, and freeze them until just solid. Then transfer the frozen vegetables to containers and store them in the freezer.

another area in the freezer for storage. Then you can add another batch to be frozen.

Your freezer can only freeze a limited amount of food at a time, usually two to three pounds of food for each cubic foot of freezer space. Don't try to freeze any more than that or the food will freeze too slowly and quality will be lowered. The amount of food your freezer can freeze at once helps you determine how much food to prepare for the freezer on any particular day. If you have more food to be frozen than your freezer can take, either refrigerate packages for a day or so (not much longer), or cart it all to a locker to be frozen, then transfer it to your home freezer. Always try to keep a cold spot free to quickly freeze additional food.

When you're done freezing food In quantity, reset the control to the setting that will maintain 0°F.

Serving frozen vegetables

Most frozen vegetables should be cooked without thawing. Corn-on-the-cob is a major exception; it must be thawed completely before cooking. Greens should be partially thawed in order to separate the individual leaves before cooking. Vegetables fully cooked before freezing should also be partially thawed before heating. Once they're thawed, use your vegetables as quickly as possible. Food that's been frozen spoils more quickly than fresh food.

Cooking frozen vegetables. For best results, cook frozen vegetables just as you would fresh ones — but cook them for a shorter period, since blanching shortens cooking times. Prepare only the amount of vegetables you'll consume at one meal, and use as little cooking water as possible.

For each pint of frozen vegetables, heat 1/4 to 1/2 cup water to boiling in a small or medium saucepan. Add the vegetables and keep them over high heat until the water returns to a boil. Break vegetables into individual pieces with a fork as they heat. When the water boils again, cover the pan, reduce the heat, and simmer just until the vegetables are tender. The recipes in this book give specific postfreezing cooking times for each vegetable. Begin timing when the cooking water returns to a boil. When crisp-tender, add butter or margarine, salt, pepper, or other seasonings to taste. Serve vegetables immediately after cooking, so they won't lose nutrients.

For tray-frozen vegetables, just remove the amount you need from the freezer. Increase cooking water to a little more than 1/2 cup if you plan to serve more than 2 cups of vegetables. Cook as above.

For pouched vegetables, follow the cooking directions that come In the heat-sealer's instruction book.

Butter sauce for pouched vegetables. For each 1 to 11/2 cups vegetables in small boilable pouches, add 2 tablespoons water, 1 tablespoon butter, 1/4 to 1/2 teaspoon salt, and a dash oregano, basil, savory, chervil, tarragon, thyme, sage, marjoram, or other herbs appropriate to your vegetable. Seal, label, and freeze. Heat as the manufacturer directs.

Soups, casseroles, sauces, gravies, dips, and other mixtures need only be heated to serving temperatures. Baked goods such as zucchini bread or carrot bread can be served just after thawing.

Rules for safe freezing

For clean and safe-to-eat foods, always follow the freezing recipe directions exactly, use the containers and equipment called for, and keep in mind the following Do's and Don'ts:

DO

- Work in a clean kitchen with clean floors, counter tops, cabinets and range, and clean equipment.
- Keep utensils that handle raw meat and poultry scrupulously clean. That means scrubbing, washing, and rinsing knives and cutting boards between each type of cutting or chopping task.
- Work with clean food. Wash, scrub, and rinse vegetables in several waters, lift food out of the water to drain, and don't let water drain off over food.
- Work with clean dishcloths and towels, clean hands, and clean clothes.
- Wash your hands each time you touch something other than food, such as your hair, your face, the phone, a child, or a pet.
- Get out all the necessary equipment. Wash it and ready all ingredients before you start to follow recipe directions, so there'll be no delays and no chance for food to spoil.
- Remember to protect your hands when working with hot foods. Use hot pads and tongs.
- Be extra cautious with large pots or kettles of boiling water or food. Don't move them, but keep them on the range and work there.
- Avoid any sudden changes in temperatures when working with can-or-freeze jars. Putting a hot jar on a counter or in a cold draft could cause it to break.
- Always read and follow manufacturer's directions for special equipment or appliances.
- Use the very best, most perfect food for freezing. Spending time and money to freeze less than the best is a waste.
- Blanch all vegetables before freezing. Blanching destroys enzymes that can cause chemical

changes in foods, and is an essential step.

- Use moisture/vaporproof containers and seal properly, following recipe directions exactly. Poor packaging can cause freezer burn, off-flavors, and less-than-the-best foods.
- Freeze foods quickly to prevent large ice crystals from forming. Follow the directions for quick-freezing.
- Buy a freezer thermometer and check it regularly. It should read 0°F at all times — any higher temperature and you're shortening the freezer life of the food.
- Keep an inventory of your frozen vegetables, so you can use them within the best part of their freezer life. Most vegetables will maintain quality for a year. Vegetables that have been fully cooked before freezing should be stored for a much shorter time — no more than a month.
- Cook and serve vegetables as each recipe directs. Vegetables are best cooked directly from the frozen state, in a very small amount of water and just until tender.
- Put your freezer in a convenient, cool, dry, well-ventilated location and clean and/or defrost it once a year.

DON'T

- Don't use your hands when a kitchen tool will do the job. Keep fingers out of food if at all possible.
- Don't try shortcuts or substitutions or time-saving gimmicks. There's only one correct way to prepare food for freezing, and the techniques and recipes that follow are based on it.
- Don't cook or prepare food for preserving when you're sick.
- Don't prepare food if you have sores on your hands, unless you wear rubber gloves.

BASIC FREEZING STEPS

By now you can see that preparing vegetables for the freezer isn't too different from preparing them for dinner. However, you must always follow the freezing recipes exactly. The recipes in the next section give you specific instructions for each vegetable, but here is a summary of the basic steps:

1. Check your freezer's size and estimate how much food you can freeze in a 24-hour period (3 pounds of food for each cubic foot of space), then check the recipe for the vegetable you want to freeze to see how much to pick for a single preparation session.
2. Select tender, young, fresh vegetables that are unblemished.
3. Wash vegetables well in plenty of cold water, scrubbing with a brush whenever necessary. Lift the vegetables out of the water to drain. Don't let them stand in water any longer than necessary, because they lose nutrients. Sort by size and handle like sizes together for even heating and cooling.
4. Put 1 gallon of water (2 gallons for greens) in the blancher; cover, and place It over high heat.
5. Prepare the sink or dishpan full of ice cubes and ice water.
6. Cut or prepare the vegetables, about 1 pound or 4 cups at a time, as the recipe directs.
7. Put 1 pound of prepared vegetables in the blancher's Insert and lower it into rapidly boiling water. Keep the heat high. Cover and begin timing immediately.
8. When the time is up, remove the cover, lift the blancher's insert up out of the blancher for a few seconds to drain, then immediately put the insert of vegetables into ice water.
9. Keep vegetables in the ice water for about the same length of time as they were in the boiling water, or until cold. Stirring will help cool the vegetables.
10. Lift the vegetables from the ice water and drain them well in a colander, sieve, or on paper towels.
11. Pack into containers, bags, or freeze on trays.
12. Label each package with contents, number of servings, and date frozen. You might also wish to list an expiration date.
13. Freeze, following the directions for quick-freezing, or any special manufacturer's directions for your freezer.
14. Most vegetables will keep for 12 months at 0°F.

How to Dry Vegetables

Drying is probably the oldest method of food preservation. Though canned and frozen foods have taken over the major role once played by dried foods, drying is still cheaper and easier by comparison. Some other advantages of dried foods are that they take up less storage space and will keep well for a long time — up to 12 months — if prepared and stored properly. Unlike frozen foods, they are not dependent on a power source. Though you may find canned and frozen vegetables are closer in taste and appearance to fresh food, you'll like having a stock of dried vegetables on hand to add variety and special flavor to meals.

STOPPING THE SPOILERS

Drying preserves vegetables by removing moisture, thus cutting off the water supply that would nourish food spoilers like bacteria, yeasts, and molds. The moisture content drops so low that spoilage organisms can't grow.

Although there's a definite technique to drying vegetables, it isn't quite as precise as the procedures used for freezing or canning. Unless you'll be using an electric food dryer, you'll have to use trial and error to find the best way to maintain the proper oven temperature throughout the drying process and to provide good ventilation so moisture from the food can escape. Drying times are given in the recipes for the individual vegetables, but these times are only approximate. Every oven is different, and drying times also depend on how many vegetables you're drying at once, how thinly they've been sliced, and how steady you've kept the heat. So you'll have to experiment at first with drying times. Experience is the best teacher when it comes to judging when your vegetables are dry enough to keep the spoilers from contaminating them.

Vegetables for drying

There are a great many vegetables you can dry at home for use in perking up your salads, soups, stews, and casseroles. Good vegetables to dry include green beans, corn, peas, peppers, okra, onions, mushrooms, tomatoes, and summer squash. Herbs also drywell. For more information on drying herbs, see "How to Store and Use Herbs," later in this book.

Although many vegetables drywell, some vegetables should be preserved by other methods for best results. For example, lettuce, cucumbers, and radishes don't drywell because of their high moisture content. Asparagus and broccoli are better frozen to retain their flavor and texture. And if you've got the storage space, you may find it more practical to store fresh carrots, turnips, parsnips, potatoes, pumpkins, rutabagas, and winter squash in cold storage where they'll keep for several months without any special preserving treatment.

FOOD DRYING METHODS

The sun, of course, Is the food dryer our ancestors used. If you live where Old Sol shines long, you too can dry fruits and vegetables outdoors. But those in less sunny regions will want a little help from a kitchen oven (gas, electric, convection, or microwave) or one of the new electric dryers or dehydrators. You can also make your own box dryer.

Oven drying is faster than using an electric dryer or dehydrator, but the electric dryers can handle much larger food loads than any of the ovens. Oven drying is best for small-scale preserving, since the ordinary kitchen model will hold no more than four to six pounds of food at one time. If you've got an extra-big vegetable garden and expect to dry food in quantity, you may want to investigate the new electric dryers or dehydrators, available in some stores and through seed catalogs. Several of the small convection ovens now on the market also have special racks available for drying vegetables. When using an electric dryer, or a convection or microwave oven for drying vegetables, always read and follow the manufacturer's directions.

Oven drying

Oven drying may be the easiest way for you to dry food, because it eliminates the need for special equipment. If you've never tried dried vegetables before, why not do up a small batch and sample the taste and texture?

Gas and electric ovens. Preheat your gas or electric oven to 140°F for drying vegetables; you'll need an oven thermometer that registers as low as 100°F in order to keep this temperature constant throughout the many hours of the drying process. Since ovens will vary, you'll probably have to experiment until you learn what works best with yours. For example, the pilot light on some gas stoves may provide just enough heat, or the light bulb in the oven may keep it warm enough for drying vegetables. Some electric ovens have a "low" or "warm" setting that may provide the right temperature for drying.

You must keep the oven door open slightly during drying, so moist air can escape. Use a rolled newspaper, wood block, hot pad, or other similar item to prop open the oven door about one inch for an

electric oven and four to six inches for a gas oven. Sometimes it also helps to place an electric fan set on "low" in front of the oven door to keep air circulating. Don't use a fan for a gas oven with a pilot light, though; it can blow out the pilot.

You'll be able to read the oven thermometer easily if you put it in the middle of the top tray of vegetables, take a reading after the first 10 minutes, and, if necessary, make adjustments in the door opening or the temperature control. After^ that, check the oven temperature every 30 minutes during the drying process to be sure it remains constant at 140°F.

To keep air circulating around the food, your drying trays should be one to two inches smaller all around than the interior of your oven. If you want to add more trays, place blocks of wood at the corners of the oven racks and stack the trays at least one-and-a-half inches apart. You can dry up to four trays at once in a conventional oven, but remember that a big load takes longer to dry than a smaller one. Don't use the top position of the oven rack in an electric oven for drying, because food on the top tray will dry too quickly.

Since the temperature varies inside the oven, it's important to shift your vegetable drying trays every half-hour. Rotate the trays from front to back, and shift them from top to bottom. Numbering the trays will help you keep track of the rotation order. You'll also need to stir the vegetables every 30 minutes, to be sure the pieces are drying evenly.

Convection ovens. To dry vegetables in a convection oven, arrange them on the dehydrating racks provided, and place the racks in a cold oven. Set the temperature at 150°F for vegetables, 100°F for herbs. The air should feel warm, not hot. Keep an oven thermometer inside the oven, so you can keep track of the temperature. Prop the oven door open one to one-and-a-half inches to allow moisture to evaporate. Set the oven timer to the "stay on" position. Or, if your oven doesn't have a "stay on" option, set it for maximum time possible, then reset It during drying, if necessary. Drying times in a convection oven are usually shorter, so check foods for doneness at the lower range of times given in the recipes. Rotate the racks and stir the vegetables as you would using a conventional oven.

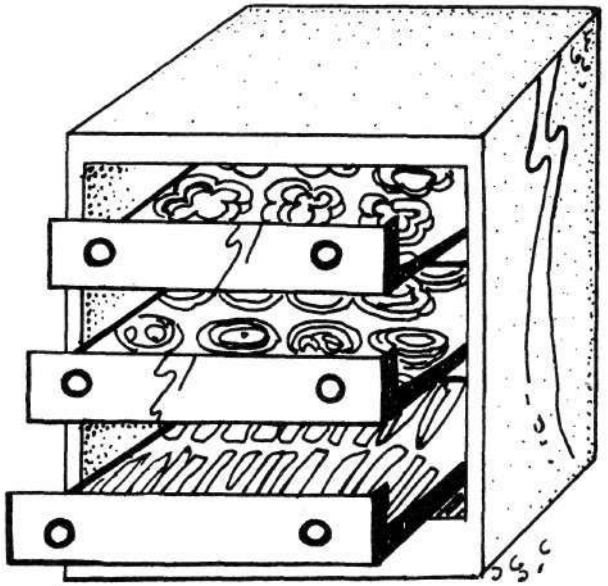
Microwave ovens. To dry foods in a microwave oven, follow the directions that come with your appliance. Usually, you arrange the prepared vegetables in a single, even layer on paper towels, cover them with more paper towels, and then dry the food at a reduced power setting. If you have a microwave roasting rack, arrange the vegetables on It before drying. Stir the vegetables and replace the paper towels with fresh ones periodically. Exact drying times can vary widely, depending on the wattage and efficiency of your oven, the food itself, and the humidity, so you'll need to check frequently *and* keep a record of best drying times for reference.

Food dryers

Both commercial and homemade food dryers provide automatically controlled heat and ventilation. You can buy the new electric dryers or dehydrators in many hardware, housewares, farm supply, and health food stores. Prices range from $25 to $100, depending on the size of the appliance and other special features. Or you can make your own drying box, following the directions given below.

Electric dryers or dehydrators. These are lightweight metal boxes with drawer racks for drying foods, which will hold up to 14 pounds of fresh vegetables. If you'll be doing a great deal of home drying, look into an electric dryer, because drying large quantities of vegetables could tie up your kitchen oven for days at a time. Although electric dryers use less electricity for drying than would an electric oven for the same amount of vegetables, electric dryers run at lower temperatures and drying times are a bit longer.

When using an electric dryer or dehydrator, always follow the manufacturer's directions for drying foods.



An electric dryer, or dehydrator, is a wise buy if you're drying large quantities of vegetables at home; it takes a little longer than your electric oven, but uses less energy.

Homemade drying box. A simple-to-make drying box can be constructed from a cardboard box, as in the instructions that follow. Or you may invent some other alternatives. For example, your radiators may send out enough heat to dry foods in winter, or perhaps your attic in the summer is hot and dry enough. Never use space heaters for drying vegetables, though — space heaters stir up dust and dirt, which contaminate the food.

How to make a drying box. A hardware or discount store should have everything you need to make this simple dryer:

- Either a metal cookie sheet with sides or a jelly-roll pan is needed to hold the food.
- An empty cardboard box (that has the same top dimensions as the cookie sheet) forms the drying box. The sheet should just fit on top of the box, or the rims of the sides should rest on the edges of the open-topped box.
- A box of heavy-duty or extra-wide aluminum foil is used to line the box.
- A small can of black paint is used to paint the bottom of the cookie sheet; buy a spray can or a small brush.
- A 60-watt light bulb and socket attached to a cord and plug provide the heat.

Line the inside of the box with foil, shiny side up. Cut a tiny notch in one corner for the cord to run out. Set the light fixture in the center, resting it on a crumpled piece of foil. Paint the bottom of the cookie sheet black and let it dry.

Prepare the vegetables according to the recipe. Spread them in a single, even layer on the black-bottomed cookie sheet. Then put the sheet in place on top of the box. Plug in the light bulb to preheat the box and dry until the food is done according to the recipe. Each recipe specifies how to tell when food is sufficiently dry. If you're drying more than one sheet of food you II have to make more than one drying box. Don't prepare more food than you can dry at one time.

BASIC DRYING EQUIPMENT

Unless you decide to buy an electric dryer or dehydrator, you've probably already got everything necessary for home drying vegetables. In addition to an oven or a box food dryer, you'll need:

- A scale to weigh food before and after drying.
- An oven thermometer that will read as low as 100°F for maintaining proper oven temperature.
- Sharp stainless steel knives that won't discolor the vegetables, for thin-slicing, paring, or cutting the food in half.
- A cutting board for chopping and slicing. Be sure to scrub the board thoroughly before and after use.
- Baking or cookie sheets for use as drying trays. Unless you're making a box food dryer, cookie sheets without raised edges are best, since they allow hot air to circulate around all sides of the vegetables. (For microwave or convection oven drying, you'll need a special rack.) Baking or cookie sheets used for drying should be at least one to two inches smaller all around than the inside of your oven, so air can circulate.
- A blancher for pretreatment of most vegetables. Use a ready-made blancher; or make one using a deep pot with a cover, and a colander or gasket that will fit down inside the pot. For steam blanching, you'll need a rack or steamer basket.
- A long, flexible spatula for stirring the vegetable pieces to insure even drying.
- Airtight storage containers, with tight-fitting lids, that are also moisture/vaporproof. Use glass canning or other jars, coffee cans lined with plastic bags, freezer containers, or refrigerator-ware. You can also use double plastic bags; close them tightly with string, rubber bands, or twist ties.
- An electric fan to circulate the air in front of your oven, if necessary.

BASIC INGREDIENTS

Choose perfect vegetables that are tender, mature (but not woody), and very, very fresh. Vegetables must be prepared and dried immediately after harvesting, or they'll lose flavor and quality. Every minute from harvesting to the drying tray counts — so hurry. Never use produce with bad spots, and harvest only the amount of vegetables you can dry at one session.

Since vegetables must be chilled quickly after blanching, you'll need ice at hand to keep the cooling water really cold. Keep a reserve of ice in the freezer and you won't run short. One way is to start filling heavy-duty plastic bags with Ice cubes a few days before you'll be home drying; or rinse out empty milk • cartons, then fill them with water and freeze.

The kitchen sink is a favorite spot for holding ice water to chill vegetables, but if you want to keep it free for other uses, a plastic dishpan or other large, clean container also works very well.

BASIC DRYING TECHNIQUES

Although the techniques for drying vegetables aren't as precise as those for freezing or canning,

there's definitely a right way to go about it. As with all preserving methods, you must always begin with the freshest and highest-quality vegetables to insure good results. Cleanliness and sanitation when handling and preparing the food are also crucial. And, though drying vegetables isn't difficult to do, it demands plenty of careful attention. The vegetables must be stirred, the temperature checked, and tray positions changed about every half hour. That means you must be at home during the whole time it takes to dry your vegetables.

Speed is of the essence when preparing foods to dry. For best results, vegetables should be blanched, cooled, and blotted dry within a very short time of harvesting. And you must never interrupt the drying process once it's begun. You can't cool partly dried food and then start it up again later, because there's a chance bacteria, molds, and yeasts will find a home in it. Always schedule your home drying for a day when you're certain your work won't be interrupted.

Cleaning and cutting

Harvest only as much food as you can dry at one time. Using a kitchen oven, that's about four to six pounds; an electric dryer or dehydrator can handle up to 14 pounds of fresh produce. Wash and drain the vegetables, then cut and prepare as the recipe directs. Depending on the size of the vegetables and the dryer, that could mean slicing, grating, cutting, or simply breaking the food into pieces so it will dry evenly on all sides. Remember that thin pieces dry faster than thick ones. If you have a choice between French-cutting and crosscutting green beans, remember that the French-cut beans will dry faster.

Blanching

Nearly all vegetables must be blanched before drying. Blanching—a brief heat treatment—stops the action of enzymes, those catalysts for chemical change present in all foods. If certain enzymes aren't deactivated before vegetables are dried, the flavor and color of the food will be destroyed. The drying process alone isn't enough to stop enzyme activity.

Although blanching can also help seal in nutrients, some other water-soluble nutrients are leached out into the cooking water. You may want to steam blanch your vegetables; it takes a bit longer, but won't lead to as great a loss of nutrients.

Always follow the blanching times given in the recipes exactly. Overblanching will result in the loss of vitamins and minerals; underblanching won't do the job of stopping enzyme action. Either way, you'll end up with an inferior product.

Boiling water blanching. Heat one gallon of water to boiling in a blancher. Put no more than one pound or four cups of prepared vegetables at a time into the blancher's insert, colander, or strainer, and carefully lower it into boiling water for the time given in the recipe.

Steam blanching. Pour enough water into the blancher to cover the bottom, but not touch the insert. Heat to boiling. Arrange the prepared vegetables in a single layer in the blancher's insert; put them in the blancher over boiling water, cover tightly, and steam for the time given in the recipe. You can use any large pot or kettle for steam blanching by putting a rack about three inches above the bottom to hold the vegetables in the steam and up out of the boiling water. You may also wish to put the vegetables in a cheesecloth bag to keep the pieces together during blanching.

Chilling

You must always chill blanched vegetables before drying them, to be certain the cooking process has stopped. After removing the vegetables from the blancher, immerse the colander or steamer rack full of vegetables in a sink full of ice water or a dishpan full of ice water. The vegetables should be chilled for the same amount of time the recipe gives for blanching in boiling water. Drain well, then blot with paper towels.

Preparing to dry

Spread the blanched and drained vegetable pieces in a single, even layer on the drying tray. (You can dry more than one vegetable at the same time, but strong-smelling vegetables such as onions, cabbage, and carrots should be dried separately.) Put the trays in the oven or electric dryer, leaving at least one to two inches between the trays for air circulation.

Maintaining **proper** drying temperature

Vegetables must be dried at low, even temperatures — just enough heat to dry the pieces without cooking them. The proper temperature for drying in a conventional oven is 140°F, 1S0°F for convection ovens. Follow the manufacturer's directions for microwave ovens and all other appliances. Maintaining the right temperature steadily, with some air circulation, is the trick to successful drying. Electric dryers and dehydrators automatically maintain the right temperature. For

oven drying or when using a homemade box dryer, check your oven thermometer every half hour. (To insure even drying, you must also stir the vegetables every 30 minutes or so, shift the trays from top to bottom, and rotate the trays from front to back.)

Although rapid drying is important, too rapid drying in an oven will result in the outer surface of the food hardening before the moisture inside has evaporated (case hardening). You can prevent case hardening by keeping a constant watch on the oven temperature and doing whatever is needed to maintain the heat at 140°F.

Scorching. Each vegetable has its own critical temperature beyond which a scorched taste will develop. Although there's not much danger of scorching at the start of the drying process, vegetables can scorch easily during the last couple of hours. Even slight scorching will ruin the flavor and affect the nutritive value of dried foods, so be extravigilant about maintaining the proper temperature toward the end of the drying process.

Ventilation. When vegetables are drying, the moisture they contain escapes by evaporating into the surrounding air. If the air around the food is trapped, it will quickly reach a saturation point. Trapped, saturated air won't be able to hold any additional moisture — and drying won't take place. For this reason, ventilation in and around your oven is as important as keeping the temperature constant.

Electric dryers or dehydrators automatically provide proper ventilation. With oven drying or when using a homemade box dryer, you'll need to leave the oven door slightly ajar — and possibly use an electric fan to insure good air circulation.

In addition, the cookie sheets or trays you use for drying should be at least one to two inches smaller all around than the inside of your oven so air can circulate around the front, sides, and back of the trays. There should also be at least three inches of air space at the top of the oven.

Testing for doneness

In most forms of food preserving, processing times are exact. You know just how long it takes before the food is done. However, the times for drying vary considerably — from four hours to more than 12 — depending on the kind of vegetable, how thinly it's sliced, how much food is on each tray, and how much is being dried in the oven or dryer at one time. The recipes that follow give you the drying time range for each vegetable, but the only way you can be sure the food is sufficiently dry is to test sample pieces.

When you think the vegetables are dry, remove a few pieces from the tray, then return the tray to the oven. Let the sample pieces cool before testing — even food that's perfectly dry will feel soft and moist while still warm. When the pieces are cool, follow the test for doneness given for the vegetable in each recipe. A rule of thumb is that properly dried vegetables are hard and brittle to the touch. Exceptions to the rule are mushrooms, sweet peppers, and squash, which will feel pliable and leathery when dry. Some food experts recommend the hammer test: if sufficiently dry, the vegetable pieces will shatter when struck with a hammer.

Conditioning

Foods don't always dry evenly, nor does each piece or slice dry at exactly the same rate as all the others. To be sure all the food in a single batch is evenly dried, you'll have to condition it. Put the cooled, dried vegetables into a large, deep crock, dishpan, jar, or coffee can; then store it in a warm, dry room for a week to 10 days. Cover the jar or can lightly with cheesecloth to keep out insects, and stir the dried pieces at least once a day so that the moisture from any underdried pieces will be absorbed by the overdried pieces.

After conditioning, give the vegetables one final treatment to get rid of any insects or insect eggs. Either put the dried vegetables in the freezer for a few hours, or heat them on a cookie sheet in a closed oven at 175°F for 15 minutes. Be sure to let the food cool completely again before packaging.

HOW TO STORE DRIED VEGETABLES

Keeping out air and moisture is the secret to good dried foods. To maintain the quality and safety of your dried vegetables, you'll need to take special care when packaging and storing them.

Even when you're using an oven or an electric dehydrator, you'll have to watch out for the effects of humidity on drying foods. Choose a bright, sunny day for your home drying—that way you'll keep the dried vegetables from picking up moisture from the surrounding air after they leave the oven or dryer.

Packaging

Dried foods are vulnerable to contamination by insects as soon as they're removed from the oven or electric dryer. To protect them, you must package dried vegetables in airtight, moisture/vaporproof containers just as soon as they're completely dry. Canning jars that have been rinsed out with boiling

water and dried, of course, make good containers, as do coffee cans and plastic freezer bags. When using a coffee can, first wrap the vegetable pieces in a plastic bag to keep the metal of the can from affecting the flavor of the food.

Pint-size containers or small plastic bags are best for packaging dried vegetables. Try to pack the food tightly but without crushing it. If you're using plastic bags, force out as much air as possible before closing them. By using small bags, several may be packed into a larger jar or coffee can — that way you can use small portions as needed, without exposing the whole container to possible contamination each time it's opened.

Storing foods safely

Store your packaged, dried vegetables in a cool, dark, dry place. The cooler the temperature of the storage area, the longer foods will retain their high quality. However, dried foods can't be stored indefinitely, since they do lose vitamins, flavor, color, and aroma during storage. Your pantry or kitchen cupboards may provide good storage, if the area remains cool. A dry basement can also be a good spot. Dried vegetables can be stored in the freezer, too — but why take up valuable freezer space with foods that will keep at cool, room temperature?

Many dried vegetables will keep up to 12 months. If properly stored. Carrots, onions, and cabbage will spoil more quickly, so use them up within six months.

To be on the safe side, check the packages of dried vegetables from time to time. If you find mold, the food is no longer safe and should be discarded immediately. If you find a little moisture, but no spoilage, heat the dried vegetables for 15 minutes in a 175°F oven; then cool and repackage. If you find much moisture, the vegetables must be put through the entire drying process again. Remember, you must always cool dried foods thoroughly before packaging; if packaged while still warm, they'll sweat and may mold.

HOW TO USE DRIED VEGETABLES

To use dried vegetables, you have to reverse the drying or dehydration process to rehydrate them. This is accomplished in water or other liquid. If you soak dried vegetables before using them, they'll cook much faster. To rehydrate, add two cups of water for each cup of dried vegetables; boiling water will shorten the soaking time. After soaking, the vegetables should regain nearly the same size as when fresh.

Rehydrated vegetables are best used in soups, stews, salads, casseroles, and other combination dishes. See the recipes that follow for some serving suggestions.

BASIC DRYING STEPS

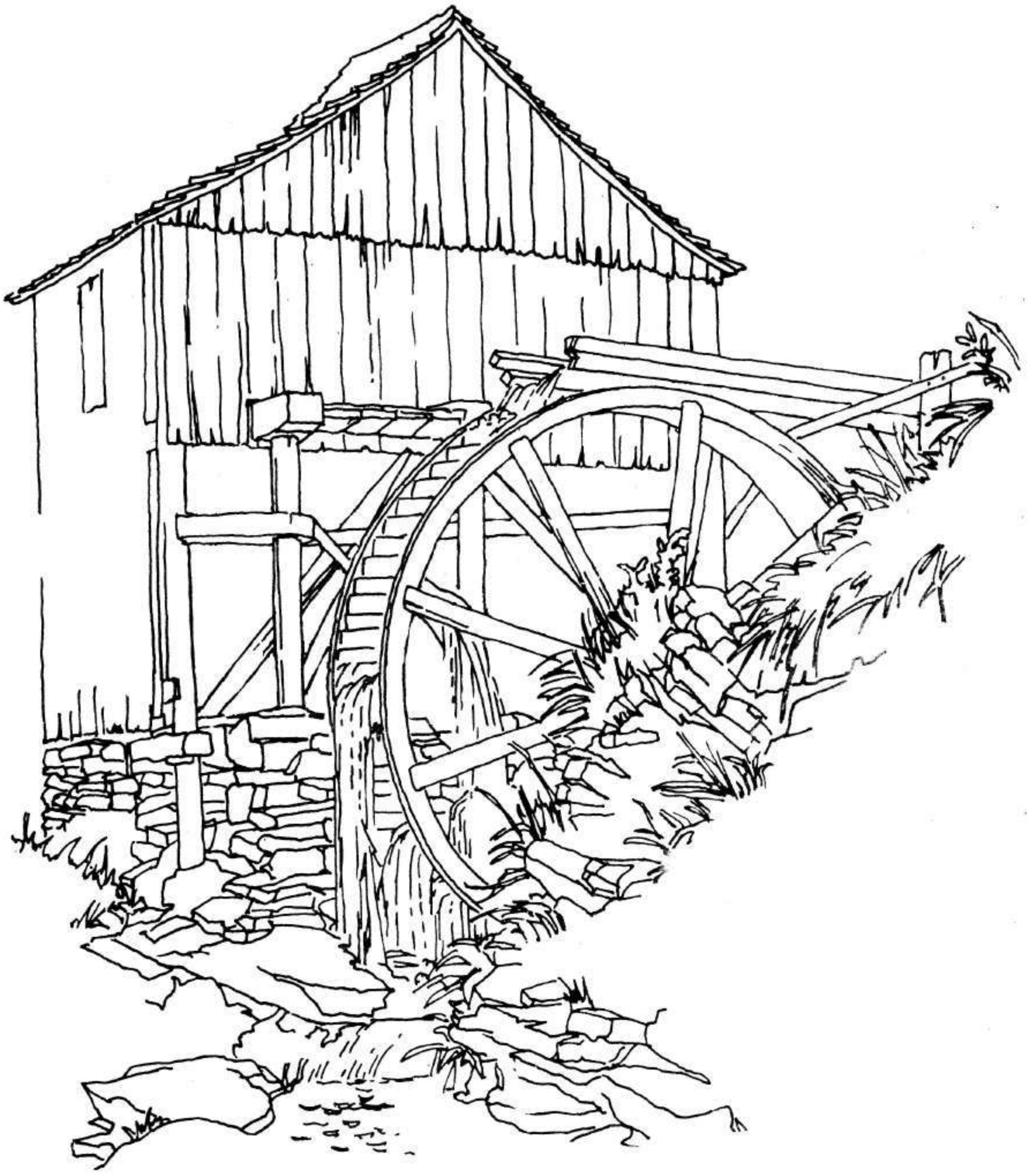
The recipes that follow give you specific directions for drying each vegetable. To prevent problems, keep these basic steps in mind when home drying foods. Remember that only the highest quality vegetables are suitable for drying.

1. Select vegetables that are freshly picked, tender, and just mature enough to eat.
2. Set out all ingredients and equipment. Wash and dry all utensils, counter tops, working surfaces, and your hands.
3. Preheat your conventional oven to 140°F, or follow the manufacturer's directions for your electric dryer or dehydrator, or a convection or microwave oven.
4. Wash the vegetables thoroughly, scrubbing with a brush if necessary, but handling them gently to avoid bruising.
5. Cut, slice, or grate the food according to the recipe directions.
6. Blanch the vegetables in small amounts at a time, according to recipe directions. For steam blanching, fill the blancher with just enough water to cover the bottom, but not to touch the basket or rack. For blanching by boiling, fill the blancher about half full, then begin heating. After blanching, chill the vegetable pieces in ice water for the same amount of time the recipe gives for blanching in boiling water.
7. Drain the chilled vegetables well, blot them dry, then spread them in a single, even layer on cookie sheets or on the racks of an electric dryer. Don't crowd the vegetables on the sheet and don't prepare more vegetables than you can dry at one time.
8. For conventional oven drying, put an oven thermometer toward the back of the tray. Put the tray on the top shelf in a preheated oven, and maintain an oven temperature of 140°F.
9. For box drying, turn on the light bulb for 10 to 15 minutes to preheat the box. Place the tray on top of the box.
10. For convection oven drying, place the racks full of food into a cold oven. Set the temperature at 150°F. Open the oven door 1 to *VA* inches. Set the oven timer to the "stay on" position, or for as long as it will run, resetting as needed.
11. For drying in an electric dryer or dehydrator.

or a microwave or convection oven, follow the manufacturer's directions.

12. For both oven and box drying, check the trays often, and stir the vegetables on the trays, moving the outside pieces to the center. For oven drying, turn the tray from front to back and — if drying more than 1 tray — change the trays from shelf to shelf for even drying. Check the trays more frequently during the last few hours of drying to prevent ' scorching. For microwave oven drying, follow the manufacturer's directions. Use the lower end of drying times given in the recipes as a guide for doneness when you're using a conventional, microwave, or convection oven. The upper range of drying times is a guide to doneness when you're using an electric dryer or dehydrator.
13. To test for doneness, remove sample pieces, cool, and then follow the recipe directions for testing for doneness. When the vegetables are completely dry, as described in each recipe, remove them from the oven or box and let stand until cooled. Test the vegetables again after cooling. If the food still shows some moisture, return it to the oven or dryer until completely dried.
14. Turn the dried vegetables into a deep container, cover lightly with cheesecloth, and condition, stirring once a day for a week to 10 days.
15. Pack into vapor/moistureproof, airtight containers or double plastic bags and store in a cool, dark, dry place for up to 12 months.
16. To rehydrate, put the vegetables in a pan or bowl, and add just enough boiling water to cover — usually 2 cups of water per cup of dried vegetables, anywhere from 1/2 hour to several hours, depending on the vegetable.
17. Cook vegetables in their soaking water until tender, or drain and add to recipes just as you would fresh vegetables.

How to Sprout Vegetables



Sprouting is one of the easiest ways to grow fresh vegetables for eatings both in and out of season. While mung bean sprouts have long been familiar in Chinese cooking, alfalfa and other sprouts have become equally well-known in recent years. More and more ingenious and health-conscious cooks are adding a variety of sprouts to salads, sandwiches, soups, and other dishes — for both the crunch and the nutrition. Sprouts are bursting with nutrients, and certain vitamins even increase when seeds are sprouted — up to 600 percent.

And sprouts are economical, too — from a single pound of seeds, you can produce from six to eight pounds of sprouts. All you have to do is add a little moisture and a little warmth to the seeds, set them in a dark place, then sit back and watch your garden grow in just a few day's time.

It's fun to have several jars of sprouts going at once, so you'll always have variety as well as a good supply. For example, put a couple of tablespoons of alfalfa seeds in one jar, a cup of wheat or rye berries in another, and a half cup or so of lentils in a third jar. Alfalfa takes about five days to reach just the right stage for eating, but your wheat sprouts will be ready by the end of the second day. It's a fast, easy, and very rewarding way to enjoy vegetables — both the ones you grow yourself and the ones you don't.

BASIC SPROUTING EQUIPMENT

All you need to sprout seeds is a jar, some cheesecloth, plastic mesh, or plastic screen to cover the jar, and a rubber band to hold it in place. But you can also sprout seeds on a tray, on damp towels, in a clay flowerpot saucer, or in a thin layer of soil. You may also want to try the ready-made sprouters that are available in large department stores and health food stores. For example, you can buy mesh trays or sprouting lids made of plastic mesh that fit on standard one-quart canning jars. It's a good idea to try various methods to find ones that are most convenient and work best for you.

BASIC INGREDIENTS

You can sprout all kinds of seeds, legumes, and grains. Try wheat, rye, alfalfa, mung beans, chick peas, soybeans, pumpkin seeds, sesame seeds, or any of the other sprouting seeds, grains, and vegetables suggested in "Directions for Sprouting," later in this chapter. Only one thing is essential — when buying seeds for sprouting, *always* check to be sure you're getting live, untreated seed. Seeds that are intended to grow crops are specially treated to make them resistant to insects and plant diseases — and you shouldn't eat sprouts started from these chemically treated seeds.

You also can't sprout seeds that have been heat-treated, because even relatively low temperatures kill the seeds, leaving them edible but no longer capable of growth. For this reason, if you're growing beans, peas, or other vegetables for sprouting, be sure to use the drying method recommended for this purpose. Seeds dried by blanching, chilling, and heating will not sprout.

The only other ingredient you'll need for sprouting is water. Some experts recommend that you let city water (which may be high in chlorine) sit for a day or two before you use it, in order to let the chlorine dissipate into the air. When sprouting seeds, use lukewarm or room-temperature water, rather than cold or hot.

BASIC SPROUTING TECHNIQUES

Sprouting can be done in a jar, in a tray, on a towel, in a clay saucer, or in a thin layer of soil. Each method works best for certain kinds of seeds, as you'll see from the following descriptions.

Although the basic steps are quite similar from one method to the next, the times and temperatures for sprouting will vary due to temperature and humidity variations in your home. That means you've got to check sprouts frequently. After your first couple of batches, you'll have a good idea how long it takes to produce the flavor you prefer in sprouts. Many sprouters also like to save the water drained from sprouts for use in soups or sauces, or for watering houseplants.

Jar sprouting

This method works best for small seeds, such as alfalfa, clover or radish.

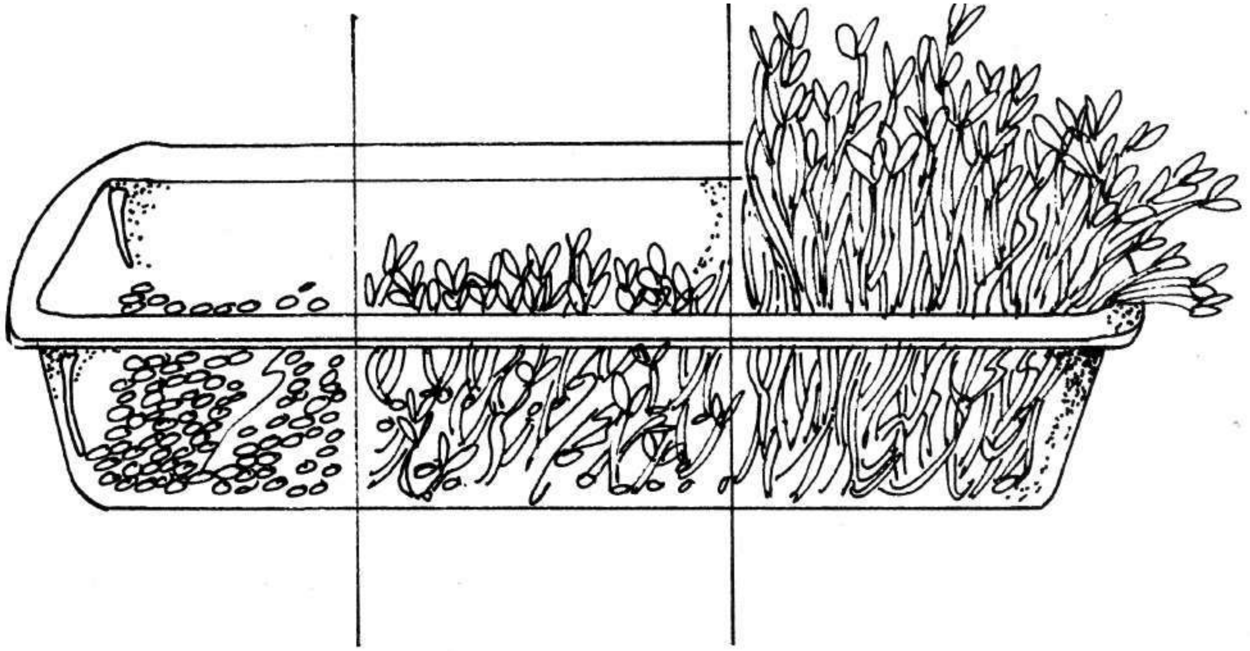
1. Rinse the seeds in lukewarm water.
2. Put the seeds in a jar, then add 3 times as much water as you have sprouts. Cover with a plastic mesh lid, cheesecloth, or nylon net, then fasten with a rubber band or canning jar-screw band. (You won't need to remove the mesh covering until the sprouts are ready to harvest.) Set aside and soak for the time given in the recipe.
3. At the end of the soaking time, drain off the water (through the mesh covering).
4. Rinse the seeds with lukewarm water and drain.
5. Set the jar in a warm (60°F), dark place, at an angle so that the sprouts can drain.

6. Rinse and drain the sprouts twice a day, or as the recipe directs. (In hot, dry weather, rinse them 3 to 4 times a day.) Turn the jar gently as you rinse and drain so that the sprouts won't break off. If the weather or your kitchen is very humid, move the sprouts to a dry place, such as near the stove or wrapped in a towel (to keep out light) near a sunny window. Too much humidity will prevent sprouting. Temperatures above 80°F can also prevent sprouting.
7. On about the fourth day, move the jar of sprouts into the sunlight so that chlorophyll can develop and turn the leaves green. Continue to rinse and drain.
8. Move the sprouts from the jar to a strainer, and rinse well to remove the hulls, if desired. Hulls can shorten storage life of sprouts, but they also add flavor.
9. Use sprouts immediately in salads, sandwiches, or as the recipe suggests. To store, put in plastic bags and refrigerate.
10. Wash and dry all equipment and put away for next use.

Tray sprouting

This method works best for seeds such as mung bean, chia, and lettuce.

1. Rinse the seeds in lukewarm water.
2. Put the seeds in a jar, then add 3 times as much water as you have sprouts. Cover with a plastic mesh lid, cheesecloth or nylon net, then fasten with a rubber band or canning jar screw band. Set aside and soak for the time given in the recipe.
3. At the end of the soaking time, rinse the seeds and spread in a tray. (The tray can be a wooden box with a plastic, nylon, or wire mesh bottom, or a perforated plastic tray.)
4. Cover the tray with plastic wrap and then with newspaper or another light-blocking cover. Keep one end of the tray bottom propped up so the sprouts can drain. Set the tray in warm (70°F), dark place.
5. Rinse and drain sprouts twice a day. (In hot, dry weather, rinse them 3 or 4 times a day.) Rinse gently (so the sprouts won't break) under a faucet (not full-force), the sprinkler attachment of your sink, or by lowering the tray slightly into a sink of lukewarm water. Cover the tray again after each rinsing.
6. On about the fourth day, move the tray of sprouts into sunlight so chlorophyll can develop and turn the leaves green. Continue to rinse and drain.
7. Move the sprouts from the tray to a strainer, and rinse well to remove the hulls, if desired.



Tray sprouting gives you sprouts from seeds in four days; it's the best method to use for sprouting seeds like mung bean, chia, and lettuce.

Hulls can shorten storage life of sprouts, but they also add flavor.
8. Use sprouts immediately in salads, sandwiches, or as the recipe suggests. To store, put in plastic bags and refrigerate.
9. Wash and dry all equipment and put away for next use.

Towel sprouting

This method works best for larger grains and seeds.

1. Soak the seeds in a jar in 3 times as much water as you have seeds for time given in recipe, then rinse and arrange on a damp towel.
2. Cover with another damp towel, and wrap in plastic wrap or place inside a plastic bag.
3. Set the bag of towels aside, in a warm (70'* F), dark place.
4. Dampen the towels daily by misting them with water.
5. If the seeds haven't sprouted after 2 days, change the towels to prevent spoilage.
6. On about the fourth day, remove the top towel and move the sprouts into the sunlight so that chlorophyll can develop and turn the leaves green. Mist as needed.
7. Move the sprouts from the towel to a strainer, and rinse well to remove the hulls, if desired. Hulls can shorten the storage life of sprouts, but they also add flavor.
8. Use sprouts immediately in salads, sandwiches, or as the recipe suggests. To store, put in plastic bags and refrigerate.
9. Wash and dry all equipment and put away for next use.

Clay saucer sprouting

This method works best for gelatinous seeds that are difficult to rinse in jars.

1. Use a clean, unglazed clay flowerpot saucer.
2. Put equal amounts of seeds and water into the saucer.
3. Set the saucer in a larger pan and pour water into the pan to within 1/2 inch of top of saucer.
4. Cover with a plate and set aside in warm (70°F), dark place.
5. Check the seeds daily, misting them if they become dry, or removing the plate cover for a day if they're too wet.
6. On about the fourth day, move the sprouts into the sunlight so the leaves turn green. Mist as needed.
7. Move the sprouts from the saucer to a strainer, and rinse well to remove the hulls, if desired. Hulls can shorten storage life of sprouts, but they also add flavor.
8. Use sprouts immediately in salads, sandwiches, or as the recipe suggests. To store, put in plastic bags and refrigerate.
9. Wash and dry all equipment and put away for next use.

Soil sprouting

This method works best for sprouting tiny greens for salads or for wheat, rye, or triticale grasses.

1. Spread a 1-inch layer of equal parts of moist peat moss and top soil over the bottom of a box.
2. Soak the seeds in 3 times as much water as you have seeds and soak for the time given in the recipe; rinse and jar sprout for 16 to 24 hours.
3. Spread the seeds over the soil in the box.
4. Cover with plastic wrap and then newspaper or black plastic (to keep out light).
5. When the sprouts are \ inch tall, remove the cover and move them into sunlight so that chlorophyll can develop and turn the leaves green. Water as needed.
6. When greens are the desired height — about 2 to 3 inches — pull or cut them, wash them well, and use them in salads. To store, put in plastic bag and refrigerate.
7. Wash and dry all equipment and put away for next use.

DIRECTIONS FOR SPROUTING VEGETABLES

Try sprouting just about any seed, grain, or legume for some of the most delicious, nutritious, and economical foods to be found anywhere. Sprouts can be added to many dishes besides salads, soups, and sandwiches. They're delicious baked into whole-grain breads or muffins, blended into juices, or added to granola or yogurt. You can sprinkle them on casseroles and on meat, fish, or fowl dishes of all ^ kinds. You can even top sprouts with tomato sauce and eat them like spaghetti.

The instructions below will give you some idea of the yield you can expect from sprouting various seeds and grains, but yields can vary considerably, depending on the size of the seeds, the temperature, and the length of the sprouts when you harvest them. Generally, small seeds—like chia — yield about eight times their original bulk in sprouts; large seeds — like corn — yield about three times their

original bulk. Experiment with these wonder foods — you'll create some family favorites of your own.

Aduki (azuki) or pichi beans

Use about 1/2 cup seeds in a 1-quart jar, which will yield about2 cups of sprouts. Soak for 12 hours. Rinse 3 to 4 times daily for 3 to 4 days. Harvest when the sprouts are 1/2 to 11/2 inches long. Good in salads or casseroles, or stir-fried.

Alfalfa

Use about 21/2 tablespoons seeds in a quart jar, or sprout on trays. This will yield about 1 quart of sprouts. The yield will be 11/2 cups for each 1/4 cup sprouted, and the sprouts will be very short — only about 1/8 inch long. Soak for 8 hours. Rinse 2 to 3 times daily for 4 to 6 days. Move into sunlight to green, then harvest when the sprouts are 11/2 to 2 inches long. Use in salads, sandwiches, omelets, or as garnish. To use in baked goods, harvest sprouts after just 2 days.

Barley

Use 1 to 11/2cups seeds in a 1-quart jar, which will yield about 1 quart of sprouts. Soak for 12 hours. Rinse 2 to 3 times daily for 2 to 3 days. The sprouts will be the length of the seed. Use in salads, casseroles, and breads.

Beans, dry

Use 3/4 cup mature beans in a 1-quart jar, which will yield about 1 quart of sprouts. Soak for 14 hours. Rinse 3 or 4 times daily for 3 or 4 days. Harvest when sprouts are 1 to *11/2* inches long. Use in casseroles, soups, or dips, or steam them.

Beans, mung

Use 1/3 cup in a 1-quart jar, or tray sprout, which will yield abouti cup of sprouts. Soak for16 hours. Rinse 3 to 4 times daily for 3 to 5 days. Harvest when the sprouts are 1 to 3 inches long. Use in oriental dishes, salads, sandwiches, omelets, or stir-fry.

Cabbage

Use 3 tablespoons seeds in a 1-quart jar, which will yield about 1 quart of sprouts. Soak for 10 hours. Rinse 2 to 3 times daily for 3 to 5 days. Move into sunlight to green, then harvest when the sprouts are 1 to 11/2 inches long. Use in salads and sandwiches.

Chia

Use 1/4, cup seeds in a clay saucer or tray, which will yield about 2 cups of sprouts. There's no need to soak or rinse and drain; just mist the seeds regularly to keep them moist. After 3 to 5 days, move into sunlight to green. Harvest when the sprouts are 1 to 11/2 inches long. Use in salads, sandwiches, casseroles, and as a garnish.

Chick peas

Use 1 cup in a jar, or tray sprout, which will yield about3 cups of sprouts. Soak for 14 hours. Rinse 3 to 4 times daily for 3 to 4 days. Harvest when sprouts are 1/2 inch long. Use in casseroles, soups, salads, steamed, or as a base for dips.

Chinese cabbage

Use 1 tablespoon seeds in a 1-quart jar, or tray sprout, which will yield about 2 cups of sprouts. Soak for 8 hours. Rinse 2 to 3 times daily for 4 to 5 days. Move into sunlight to green, then harvest when the sprouts are 1 to *11/2* inches long. Use in salads, sandwiches, and juices.

Corn

Use 1 cup kernels in a 1-quart jar, or tray sprout, which will yield about 3 cups of sprouts. Soak for 20 hours. Rinse 3 times daily for 2 to 4 days. Harvest when the sprouts are 1/2 inch long. Use in casseroles, soups, and tortillas, or bake, steam, or stir-fry.

Clover

Use 1 tablespoon seeds in a 1-quart jar, or tray sprout, which will yield about 2 cups of sprouts. Soak for 8 hours. Rinse 2 to 3 times daily for 4 to 6 days. Move the jar into sunlight to green, then harvest the sprouts when they're 11/2 to 2 inches long. Use in salads, sandwiches, and juices. To use in baked goods, harvest the sprouts after just 2 days.

Cress

Use 1 tablespoon of seeds in a clay saucer or tray, which will yield about 11/2 cups of sprouts. There's no need to soak or rinse and drain; just mist with water 3 times daily for 3 to 5 days. Move into sunlight to green, then harvest when the sprouts are 1 to 11/2 inches long. Use as a spice (very peppery flavor), in salads, sandwiches, or baked goods.

Dili

Use 1/4 cup in a 1-quart jar, or tray sprout, which will yield about2cupsofsprouts. Soak for 8 hours. Rinse 3 times daily for 3 to 5 days. Move Into sunlight to green, then harvest when the sprouts are 1 to 11/2 inches long. Use in salads, sandwiches, and juices.

Fenugreek

Use 1/4 cup In a 1-quart jar, or tray sprout, which will yield about 1 quart of sprouts. Soak for 10 hours. Rinse 2 to 3 times dally for 3 to 5 days. Mist with water if tray sprouting, to keep damp. Harvest when 1/2 to 2 Inches long. Use in salads and sandwiches.

Flax

Use 1/4 cup in a clay saucer, or tray sprout, which will yield about 1 cup of sprouts. Without soaking or rinsing the seeds, mist with water 3 times daily for 3 to 5 days. Move into sunlight to green, then harvest when the sprouts are 1 to 11/2 inches long. Use in salads or juices.

Lentils

Use 3/4 cup in a 1-quart jar, or tray sprout, which will yield about 6 cups of sprouts. Soak for 8 to 10 hours. Rinse 2 to 3 times daily for 2 to 3 days. Harvest when the sprouts are 1/4 to 1/2 inch long. Use in salads, sauces, dips, juices, soups, or casseroles.

Lettuce

Use 3 tablespoons in a 1-quart jar, or tray sprout, which will yield about 2 cups of sprouts. Soak for 8 hours. Rinse 2 to 3 times daily for 4 to 5 days. Move into sunlight to green. Harvest when the sprouts are 1 to 11/2 inches long. Use as a garnish (flavor is strong).

Millet

Use 11/2 cups in a 1-quart jar, or tray sprout, which will yield about 2 cups of sprouts. Soak seeds for 8 hours. Rinse 3 times daily for 4 to 5 days. Harvest when sprouts are 1/4 inch long. Use in salads, soups, baked goods, casseroles, and juices.

Mustard

Use 3 tablespoons in a 1-quart jar, or tray sprout, which will yield about 1 quart of sprouts. Do not soak. Rinse 2 to 3 times daily for 4 to 5 days. Move Into sunlight to green, then harvest when the sprouts are 1 to 11/2 inches long. Use in salads, juices, or as garnish.

Oats

Use 11/2 cups in a 1-quart jar or sprout on towels, which will yield about 2 to 3 cups of sprouts. Soak for 1 hour. Rinse once or twice daily for 3 days. The sprouts will be the length of the seed. Use in salads, granola, and baked goods.

Peas

Use 1/2 cup black-eyed or shelling in a 1-quart jar, or tray sprout, which will yield about 1 cup of sprouts. Soak for 12 hours. Rinse 2 to 3 times daily for 3 days. Harvest when sprouts are 1/4 to 1/2 inch long. Use in salads, soups, omelets, and casseroles.

Peanuts

Use 11/2 cups in a 1-quart jar, or tray sprout, which will yield about 1 quart of sprouts. Soak for 14 hours. Rinse 2 to 3 times daily for 3 to 4 days. Harvest when sprouts are 1/4 to 1 inch long. Use In soups, steam, or stir-fry.

Pumpkin

Use 11/2 cups in a 1-quart jar, or tray sprout, which will yield about 3 cups of sprouts. Soak for 10 hours. Rinse twice daily for 2 to 3 days. Harvest when the sprouts are 1 to 11/2 Inches long; pick off hulls and rinse. Use in sauces, dips, and baked goods.

Radish

Use 3 tablespoons in a 1-quart jar, or tray sprout, which will yield about 1 quart of sprouts. Soak for 8 hours. Rinse 2 to 3 times daily for 4 to 5 days. Move into sunlight to green, then harvest when the sprouts are 1 to 2 inches long. Use in salads, sandwiches, and juices.

Rye

Use 1 cup in a 1-quart jar, or tray sprout, which will yield about 2 to 3 cups of sprouts. Soak for 12 hours. Rinse twice daily for 2 to 3 days. Sprouts will be the length of the seeds. Use in granola, salads, baked goods.

Sesame

Use 1 cup in a 1-quart jar, or tray sprout, which will yield about 2 cups of sprouts. Soak for 8 to 10 hours. Rinse 3 to 4 times daily for 3 days. The sprouts will be the length of the seed. Use in granola, baked goods.

Soybeans

Use % cup in a 1-quart jar, or tray sprout,.which will yield about 1 quart of sprouts. Soak for 12 to 24 hours, changing the soaking water once. Rinse 3 to 4 times daily for 3 to 4 days. Harvest when sprouts are 1/2 to 2 inches long. Use in oriental dishes, salads, casseroles, baked goods, or steam.

Squash

Use 1 cup in a 1-quart jar, or tray sprout, which will yield about 3 cups of sprouts. Soak for 10 hours. Rinse twice dally for 2 or 3 days. Harvest when the sprouts are 1 to 11/2 inches long; pick off hulls and rinse. Use in sauces, dips, and baked goods.

Sunflower^ hulled

Use 1 cup in a 1-quart jar, which will yield about 3 cups of sprouts. Soak for 10 hours. Rinse 2 to 3 times daily for 2 to 5 days. Harvest when the sprouts are 1 to 11/2 inches long. Use In salads, sauces, and dips.

Triticale

Use 1 cup in a 1-quart jar, which will yield about 2 to 3 cups of sprouts. Soak for 12 hours. Rinse twice daily for 2 to 3 days. The sprouts will be the length of the seed. Use in granola, salads, soups, and baked goods.

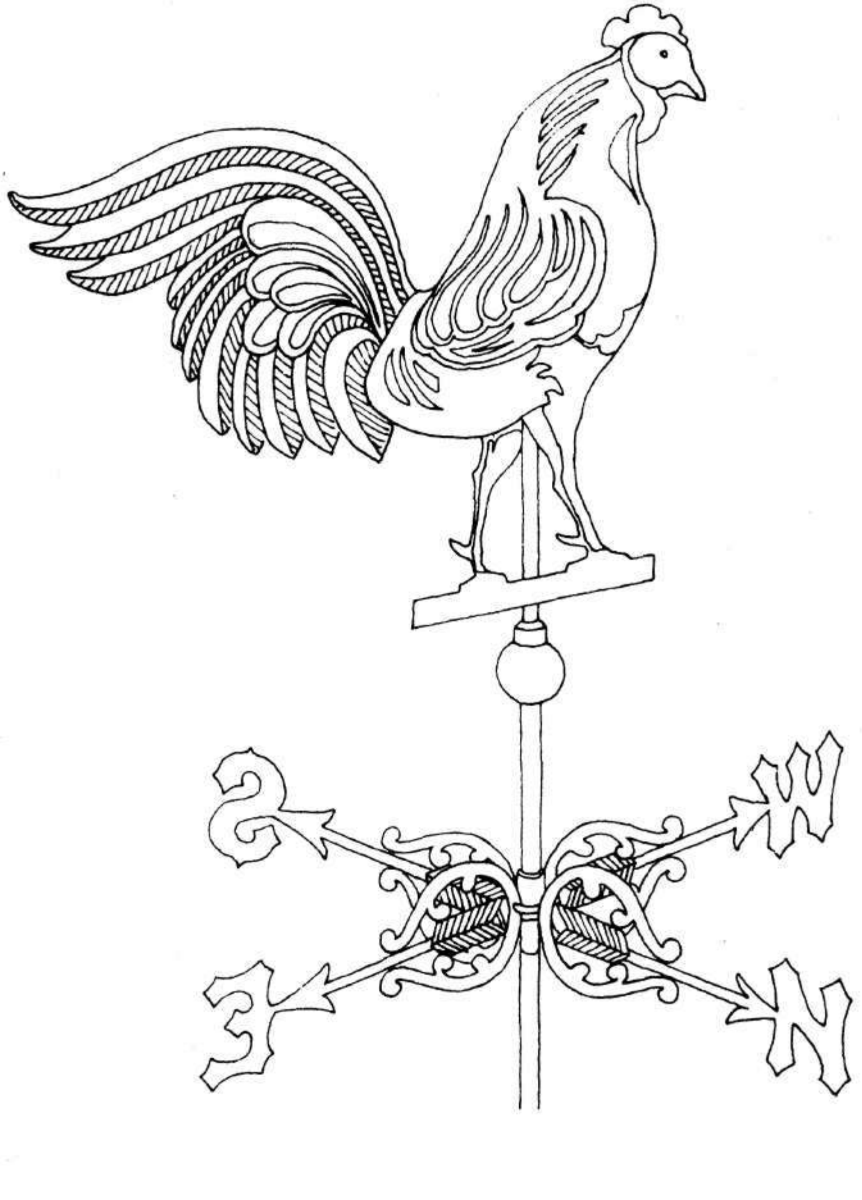
Turnip

Use 3 tablespoons in a 1-quart jar, which will yield about 1 quart of sprouts. Soak for 12 hours. Rinse twice daily for 3 to 4 days. Move into sunlight to green, then harvest when the sprouts are 1 to 11/2 inches long. Use in salads and sandwiches.

Wheat

Use 1 cup in a 1-quart jar, or tray sprout; which will yield about 4 cups of sprouts. Soak for 12 hours. Rinse twice daily for 2 to 3 days. The sprouts will be the length of the seed. Use in granola, salads, soups, baked goods.

How to Store and Use Herbs



Herbs are the secret ingredient in many a fine recipe — from the most delicate gourmet dish to the heartiest of folk fare. Yet herbs are also among the easiest vegetables to grow, to use fresh, or to store for the winter. If you live in a mild climate, you can grow herbs year-round in your garden, in window pots, along walkways, or near doorways or patios. And if you live where winters get too cold for outdoor gardening, you can grow little pots of basil or chives indoors, and freeze, dry, or salt the rest of your herb crop. Dried herbs will keep for up to a year; frozen herbs will keep fresh for several months if properly wrapped and stored.

Herbs are popular in cooking not only for the way they enhance the flavor of many foods, but for the fact that they add no calories. If you're on a special diet, herbs can add zest to those low-cal or no-salt recipes. For example, when cooking potatoes or rice, add a pinch of rosemary instead of salt to the cooking water to add a special flavor.

GROWING HERBS: ROBUST AND FINE

Some herbs are used only in food preparation (robust herbs); and others can be eaten raw as well (fine herbs). Among the most popular herbs are basil, chives, dill, garlic, marjoram, oregano, parsley, rosemary, sage, sweet marjoram, and thyme. Grow them where you can enjoy their beauty and fragrance, as well as harvest the leaves at just the peak moment for use in your favorite foods. Detailed information on growing these and other herbs is given in Parts 1 and 2.

USING FRESH HERBS

You can use fresh herbs throughout the growing season. First, gently remove a few leaves at a time, or pinch or cut off sprigs to be chopped and added to your soups, salads, and sauces. For immediate use, rinse the herbs, pat them dry, and then chop finely. If you can't use fresh herbs at once, wrap them in a damp paper towel, then in plastic wrap or a plastic bag, and refrigerate. Fresh herbs can be kept refrigerated for a few hours or up to a day or two — but no longer than that.

Fresh herbs are wonderful in any recipe that calls for herbs. However, if your recipe specifies a dried herb, you can substitute fresh by using three to four times more finely chopped fresh leaves — one teaspoon of fresh herbs is equal to 1/4 teaspoon of dried. Fresh herbs also make beautiful garnishes. Save a perfect sprig to give the finishing touch to vegetables, salads, drinks, fish, meats, casseroles, and sandwiches.

HARVESTING HERBS FOR STORAGE

Herbs can be frozen, dried, or salted for use during the fall, winter, and spring. Depending on the method you'll be using, you can cut whole stalks, remove just the leaves, or pinch off sprigs for your herbs. The dried seeds of some herbs — anise, caraway, coriander, dill, fennel, and sesame — are also used for flavorings, but most herbs are grown for their leaves.

You should harvest herbs to be stored when the flowers of the plant are just beginning to open; this is the moment when flavor is at its peak. Cut the plants on a dry, sunny morning—after the dew has dried, but before the sun gets too hot. The leaves you want are the young, tender, pungent ones growing at the top six inches of the plant. Strip off the tough, lower leaves and remove the flower clusters. Rinse the herbs with cold water to remove dirt and dust, then blot them dry with paper towels.

If you're growing herbs for their seeds, harvest the seeds as soon as the heads turn brown, but before they ripen completely and begin to fall off. Harvest the seeds on a warm, dry day, and then dry them, as detailed below. Seeds are dried in their pods, husks, or coverings. You remove these coverings by winnowing — rubbing a few seeds at a time between your palms to loosen the pod or husk, which will then fall away. Herb seeds should not be frozen or salted.

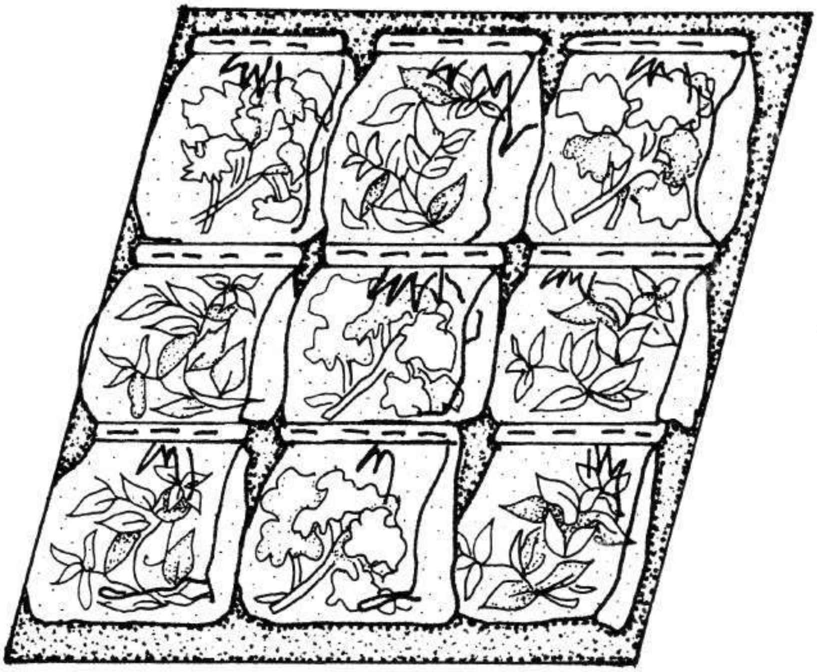
HOW TO FREEZE HERBS

Freezing is a quick way to preserve herbs that will be used in cooked dishes. Since herbs become dark and limp during freezing, they can't be used as garnishes — but their flavor remains just as good as fresh. You can chop herbs before freezing, or freeze sprigs and then just snip them, right from the freezer, into the food you're cooking.

Frozen herbs will keep for several months. If you want to store herbs for longer periods, dry them instead.

To freeze herbs, follow these step-by-step procedures:

1. Have ready a knife or scissors, paper towels, plastic bags, freezer wrap or boilable pouches, cardboard, freezer container or envelope, and labels.
2. Pick fresh, perfect herb sprigs or leaves. Wash them well, then drain and pat them dry with paper towels.
3. Pack recipe-size amounts in small plastic bags or packets made from plastic wrap, freezer



Freeze small amounts of herbs in individual plastic packets and staple them to a piece of cardboard. Label the packets and seal well.

paper or foil, or pack in boilable pouches. Seal well.

4. Staple these individual packets to a piece of cardboard, label the cardboard, and then freeze. Or pack several packets in a freezer container, large envelope, or plastic bag. Seal, label, and freeze.
5, For bouquet garni: Tie together several sprigs of different herbs — parsley, bay leaf, and thyme, for example — and pack as above. When you're ready to use it, add the whole bouquet to the recipe.

HOW TO DRY HERBS

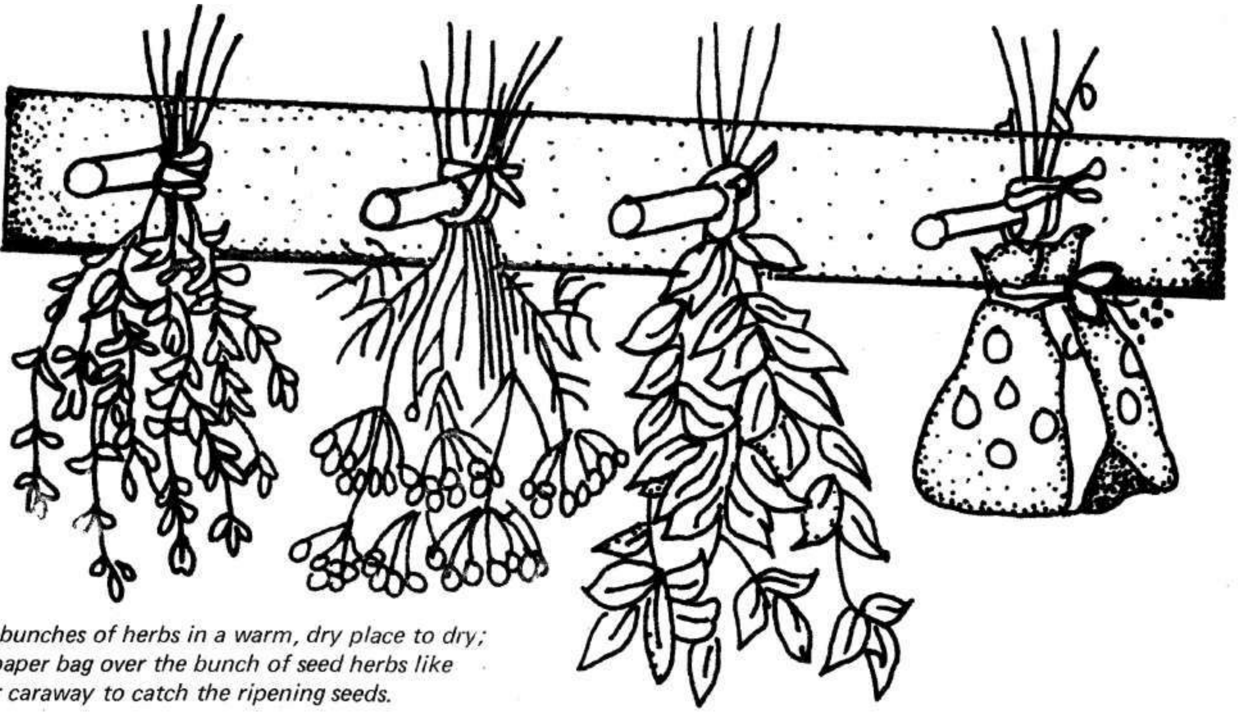
Herbs need no pretreatment before drying, just careful selection and gentle harvesting. Always choose the tender, aromatic leaves growing on the upper six inches of the plant. Herbs may be air-dried in paper bags or dried in your kitchen oven. Herbs should never be dried in the sun because direct sunlight destroys their natural aroma.

For perfect dried herbs, follow these step-by-step procedures:

1. Have ready paper towels, a knife or scissors, string, plastic wrap, cookie sheets, racks or trays and wire mesh or cloth, or brown paper bags.
2. For herb leaves, choose herbs that are just about to blossom. Make sure the herbs are tender and well-colored, with perfect leaves and no bugs. Cut off the top two-thirds of the plant. Pick early in the morning, if possible. For herb seeds, choose seeds that are fully developed and mature.
3. Wash off any dust or dirt from the leaves. Shake them gently and pat dry with paper towels.
4. Dry in bags; on trays; or in a conventional, microwave, or convection oven, as explained below.

Bag drying herbs

1. Gather 6 to 8 stalks and put them in a large brown paper bag to prevent their exposure to light. Hold the ends of the stalks at the top opening of the bag, then tie the bag's top around the stalks with a string. The leaves mustn't touch the sides of the bag, or they may stick to the paper and dry incompletely. Repeat for desired quantity of herbs.
2. Punch a few holes in the bottom and sides of each bag for ventilation, and label each bag.
3. Hang the bags by the string from hooks or hangers in an attic, covered porch, or any other



Hang bunches of herbs in a warm, dry place to dry; tie a paper bag over the bunch of seed herbs like dill or caraway to catch the ripening seeds.

warm, dry, well-ventilated spot away from direct sun.

4. Check the temperature of the area before and during drying to be sure it doesn't rise above 100°F. Herbs will lose their flavorful oils if air-dried at temperatures above 100°F.
5. If you're drying herbs outdoors, be sure to bring them in at night, so they don't pick up moisture from the night air,
6. You'll know the herbs are completely dry when the leaves fall from the stalks and can easily be crumbled between your fingers. You can strip the leaves from the stalks to crush or bottle whole, or just leave them in the paper bags until you're ready to use them.
7. If the leaves haven't dried evenly, strip them from the stalks and spread them in a single, even layer on a cookie sheet. Dry in a 200°F oven for 30 minutes, or until crumbly.
8. Store the dried whole leaves in labeled, airtight containers. In a dark, cool, dry place.

Tray drying herbs

1. Remove the leaves from the stems of the plant and place them on a cloth-covered rack or mesh screen.
2. Place the racks in a warm, dry, well-ventilated room away from direct sun.
3. Stir the leaves from time to time to be sure they dry evenly.
4. When the leaves crumble easily, they're dry.
5. Store the dried whole leaves in labeled, airtight containers, in a dark, cool, dry, place.

Drying herbs in a conventional oven

1. Remove the leaves from the stalks of the plant, and arrange them in a single, even layer on cookie sheets, racks, or trays. Use drying trays 11/2 to 2 inches smaller all around than the , inside of your oven, so air can circulate freely around them.
2. Set the trays in the oven, with at least *V/2* inches between the layers of drying trays.
3. Dry the leaves in a 120°F oven or In a drying box until the leaves will crumble easily between your fingers. Prop the oven door open slightly for ventilation and to keep the oven temperature from rising too high. The herbs will dry in 2 to 4 hours.
4. Store the dried leaves whole in labeled, airtight containers, in a dark, cool, dry, place.

Drying herbs in a microwave oven

1. Place 3 or 4 stalks between several thicknesses of paper towels on a drying rack or cookie sheet.
2. Set the sheet In the oven.
3. Dry at medium power for 2 or 3 minutes, or until the leaves crumble easily. If the herbs still

aren't dry, return the leaves to the oven at the same heat for an additional 30 seconds.
4. Store the dried whole leaves in labeled, airtight containers, in a dark, cool, dry place.

Drying herbs in a convection oven

1. Remove the leaves from the stalks, and arrange them in a single, even layer on cookie sheets, racks, or trays.
2. Set the racks in a cold convection oven.
3. Set the oven temperature setting below the "warm" or 150°F setting. Use an oven thermometer to be sure the temperature inside the oven doesn't exceed 100°F.
4. Dry the leaves until they are brittle.
5. Store the whole leaves in labeled, airtight containers, in a dark, cool, dry place.

HOW TO DRY HERB SEEDS

Herb seeds can be dried by the same method used to dry leaves. After drying, remove the outer covering from dried seeds. Just rub a few seeds at a time between the palms of your hands, and then shake them gently to let the outer seed covering fall away. Store seeds in labeled, airtight containers in a dark, cool, dry place.

STORING DRIED HERBS

As soon as the leaves are dry, store herbs whole in labeled, airtight containers in a dark, cool, dry place. Coffee cans lined with a plastic bag or tinted glass containers are best, since they keep out light. Don't crush the leaves until you're ready to use them, because whole herbs hold their flavor the longest. During the first week after drying, check the herbs to be sure they're completely dry. If you notice any moisture at all, dry the leaves a little longer.

You can keep dried herbs up to a year, if they're stored properly in a dark, cool, dry place. If your storage area is too warm, the leaves will begin to lose flavor. If the area is too moist, the herbs may cake, change color, or spoil. Always remember to close the containers tightly after each use to prevent the loss of the volatile oils which are what make herbs so flavorful.

If you want to verify the freshness of herbs you've been storing for some time, rub a leaf between your palms. If the herb is still potent, strong aroma will be released. If there's little or no fragrance released, the flavor has faded, and you'll need to put up a fresh supply.

COOKING WITH DRIED HERBS

When using dried herbs, first crush or chop the leaves to release the flavor and aroma. Use herbs singly or combine one particularly strong herb with several other milder ones. You can also make a bouquet garni by tying together or placing in a cheesecloth bag bunches of herbs such as celery leaves, parsley, onion, and thyme. Or, mix three or more herbs to make fine herbs. The most familiar combinations for fine herbs are chervil, chives, and parsley; and basil, sage, and savory.

You'll get the most from herbs in cooking if you add them at the right time. For example, when preparing stews or soups that must cook for several hours, add herbs during the last half hour of cooking time. The flavor and aroma of herbs can be lost if they cook too long. In foods that cook quickly, add the herbs immediately.

You'll get best results if you add herbs to the liquid portion of your recipe before mixing it with the rest of the ingredients. Moistening the herbs first with a little water, oil, or other suitable liquid and allowing them to stand for 10 minutes will bring out the flavor even more.

When substituting dried herbs for fresh in a recipe, use 1/4 amount specified. One teaspoon fresh herbs equals 1/4, teaspoon dried.

SALTING HERBS FOR STORAGE

You can salt away some herbs to preserve them for future use. Use pure granulated or pickling salt, not iodized table salt. This method is most popular for basil, but it can be used for other herb leaves too.

To salt herbs down, follow these step-by-step procedures:

1. Have ready pickling salt, paper towels, and jars or other containers with tight-fitting lids, and labels.
2. Choose perfect, fresh basil or other herb leaves. Wash and drain, then pat them completely dry with paper towels.
3. Pour a layer of salt into the container and arrange a layer of leaves on top.
4. Pour in another layer of salt, then add a layer of leaves. Repeat until the container is full, ending with a layer of salt. Press down firmly.
5. Cover the container tightly, label, and store it in a dark, cool, dry place. Use salted herbs just as you would fresh herbs, but be sure to rinse thoroughly to remove the salt before adding them to food.

SPECIAL TREATS WITH HERBS

A little herb goes a long way in cooking, so you'll want to find other uses for the bounty of your herb garden. Herb vinegars, herb teas, herb butters, and herb jellies are easy to make and delicious to use.

Herb vinegars

Adding sprigs of fresh herbs to vinegar provides wonderful flavor. Pretty bottles of your own herb vinegars make wonderful gifts, too. You can use any herb you like, or any combination you prefer. Tarragon in white wine vinegar, basil and garlic in red wine vinegar, and mint or savory in white or cider vinegar are just a few examples.

1. Have ready measuring cups, glass mixing bowl, saucepan, strainer, jars or bottles, and labels.
2. Select perfect, fresh herb leaves. (You'll also want perfect sprigs to go in the bottles, but don't harvest these until after you've let the leaves steep in vinegar for a few days.)
3. For each pint of herb vinegar, lightly crush about y2 cup of fresh herb leaves in large glass mixing bowl. Add 1 pint white, cider, or wine vinegar. Cover and set aside for 3 to 5 days.
4. Now gather as many perfect herb sprigs as you'll have bottles of vinegar. Wash them.
5. Wash the bottles well, rinse, and then sterilize them by simmering in water to cover for about 5 minutes.
6. Strain the vinegar and discard the herbs. Heat the vinegar to boiling.
7. Pour the hot vinegar into hot bottles or jars. Add a sprig of fresh herb to each bottle or jar.
8. Close the bottles with corks, lids, or other airtight seals. Label and store in a dark, cool, dry place.

Herb teas

Fresh herbs have long been favorites for use in infusions, or teas. You can use almost any dried herb you like, but you'll have to test and taste to determine how strong you like it. Mint, rosemary, marjoram, and thyme are favorites for tea, but why not experiment with some others, too? Use about one teaspoon of dried herb (or a combination of herbs) for each teacup (six ounces) of boiling water. Put the herbs directly into the teapot and add the boiling water, or put the herbs in a tea ball. Let steep for five to 10 minutes. Don't add milk or cream. Sweeten, if desired, with honey or sugar.

Herb butters

Herb-flavored butters make marvelous toppings for bread, vegetables, meats, and seafoods. Use anise or oregano butter on your own sweet corn; basil butter on broiled tomato slices; tarragon butter on broiled fish filets; garlic and oregano butter on French bread slices; and marjoram butter on fresh green peas.

You can chop or crush fresh or dried herb leaves to cream with softened butter, or mix the leaves and butter together in a blender or food processor. Use about two tablespoons dried or 1/2 cup fresh herbs for each stick 1/2 cup) of butter. Store herb butters tightly covered in the refrigerator. Use in a few days.